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TRANSACTIONS

OF THE

COLLEGE OF PHYSICIANS

OF

PHILADELPHIA

THIRD SERIES

VOLUME THE THIRTY-SIXTH

PHILADELPHIA
PRINTED FOR THE COLLEGE
1914

NOTICE.

The present volume of TRANSACTIONS contains the papers read before the College from January, 1914, to December, 1914, inclusive.

The Committee of Publication thinks it proper to say that the College holds itself in no way responsible for the statements, reasonings, or opinions set forth in the various papers published in its TRANSACTIONS.

EDITED BY

WALTER G. ELMER, M.D.

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DORNAN, PRINTER

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1914

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PRESIDENTS OF THE COLLEGE FROM THE TIME OF ITS INSTITUTION

ELECTED	
1787	JOHN REDMAN
1805	WILLIAM SHIPPEN
1809	ADAM KUHN
1818	THOMAS PARKE
1835	THOMAS C. JAMES[1]
1835	THOMAS T. HEWSON
1848	GEORGE B. WOOD
1879	W. S. W. RUSCHENBERGER
1883	ALFRED STILLÉ
1884	SAMUEL LEWIS[2]
1884	J. M. DA COSTA
1886	S. WEIR MITCHELL
1889	D. HAYES AGNEW
1892	S. WEIR MITCHELL
1895	J. M. DA COSTA
1898	JOHN ASHHURST, JR.
1900	W. W. KEEN
1902	HORATIO C. WOOD
1904	ARTHUR V. MEIGS
1907	JAMES TYSON
1910	GEORGE E. DE SCHWEINITZ
1913	JAMES CORNELIUS WILSON

[1] Died four months after his election.
[2] Resigned on account of ill-health.

FELLOWS

OF THE

COLLEGE OF PHYSICIANS OF PHILADELPHIA

DECEMBER, 1914

* Non-resident Fellows.
† Fellows who have commuted dues.

ELECTED

1892. Abbott, Alexander C., M.D., Sc.D. (Hon.), Professor of Hygiene and Bacteriology in the University of Pennsylvania; Member of the Board of Health of Philadelphia. 4229 Baltimore Ave.

1912. Addison, William H. F., A.B., M.B., Assistant Professor of Normal Histology and Embryology in the University of Pennsylvania. Medical Laboratories, University of Pennsylvania.

1905. Adler, Lewis H., Jr., M.D., Professor of Diseases of the Rectum in the Philadelphia Polyclinic and College for Graduates in Medicine; formerly Prosector to the Professor of Anatomy in the University of Pennsylvania; Consulting Surgeon to the Charity Hospital. 1610 Arch St.

1914. Aiken, Thomas Gerald, M.D., Assistant Visiting Physician to the Chester County Hospital, West Chester, Pa.; Pathologist to the Country Branch of the Rush Hospital for Tuberculosis. Berwyn, Pa.

1913. Alexander, Emory G., M.D., Surgeon to St. Christopher's Hospital for Children; Associate Surgeon to the Episcopal Hospital; Clinical Professor of Surgery in the Woman's Medical College of Pennsylvania, and Demonstrator of Fracture Dressings in the Jefferson Medical College; Assistant Surgeon to the Kensington Hospital for Women. 1627 Oxford St.

ELECTED

1903. Allen, Alfred Reginald, M.D., Lecturer on Neurological Electro-Therapeutics and Instructor in Neurology and Neuropathology in the University of Pennsylvania. 2013 Spruce St.

1906. Allen, Francis Olcott, Jr., A.B., M.D., Surgeon to the Dispensaries of the Presbyterian, Methodist, and Pennsylvania Hospitals. 2216 Walnut St.

1896. Allyn, Herman B., M.D., Associate in Medicine in the University of Pennsylvania; Physician to the Philadelphia General Hospital. 501 S. Forty-second St.

1888. Anders, James M., M.D., L.L.D., Professor of Medicine and Clinical Medicine in the Medico-Chirurgical College; Officer de l'Instruction Publique. 1605 Walnut St.

1905. Anspach, Brooke M., M.D., Associate in Gynecology in the University of Pennsylvania; Surgeon to the Gynecean Hospital; Gynecologist to the Philadelphia General and the Stetson Hospitals; Assistant Gynecologist to the University Hospital. 119 S. Twentieth St.

1905. Appleman, Leighton F., M.D., Demonstrator of Pharmacy and Materia Medica, and Instructor in Therapeutics in the Jefferson Medical College; Instructor in Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine; Ophthalmologist to the Frederick Douglass Memorial Hospital. 308 S. Sixteenth St.

1906. Ashhurst, Astley Paston Cooper, A.B., M.D., Instructor in Surgery in the University of Pennsylvania; Associate Surgeon and Orthopædist to the Episcopal Hospital; Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases. 811 Spruce St.

1893. Ashton, Thomas G., M.D., Physician to the Philadelphia General Hospital. 1814 S. Rittenhouse Square.

1914. Austin, J. Harold, B.S. (Univ. of Penna.), M.D., Department of Research Med., University of Pennsylvania.

1906. Babbitt, James A., A.B., (Yale), A.M. (Haverford), M.D., Professor of Hygiene and Physical Education at Haverford College; Assistant Laryngologist and Aurist, and Chief of the Out-patient Department for Diseases of the Nose, Throat, and Ear at the German Hospital; Assistant Instructor in Otology in the University of Pennsylvania; Laryngologist to the Out-patient Department of the Children's Hospital. 1901 Chestnut St.

ELECTED

1903. Bacon, John, M.D. Torresdale, Pa.

1910. Baer, Benjamin F., Jr., M.D. 2040 Chestnut St.

†1892. Baker, George Fales, B.S., M.D. 1818 Spruce St.

1911. Baldwin, James Harvey, A.B., M.D., Assistant Surgeon to the Methodist Hospital. 1426 Pine St.

1889. Baldy, John Montgomery, M.D., Professor of Gynecology in the Philadelphia Polyclinic; Surgeon to the Gynecean Hospital; Consulting Surgeon to the Jewish and the Frederick Douglass Memorial Hospitals. 2219 De Lancey Place.

1898. Balliet, Tilghman M., A.M., M.D., Professor of Therapeutics at Dartmouth College, Hanover, N. H.; Physician to the Old Man's Home. 3709 Powelton Ave.

1911. Barnard, Everett P., M.D., Obstetrician to the Maternity Hospital; Assistant Instructor in Obstetrics in the University of Pennsylvania. 119 S. Nineteenth St.

1883. Baum, Charles, A.M., M.D., Ph.D. 1828 Wallace St.

1908. Beardsley, Edward J. G., M.D., L.R.C.P. (Lond.), Associate in Clinical Medicine in the Jefferson Medical College; Chief Clinical Assistant in the Medical Department of the Jefferson Medical College Hospital; Assistant Physician to the Jefferson and Philadelphia Hospitals. 2030 Chestnut St.

*1874. Bennett, W. H., A.M., M.D., Physician-in-Charge of the Seashore House for Invalid Children, and of the Seaside House for Invalid Women, Atlantic City; formerly Physician to the Episcopal Hospital, and Physician-in-Charge of St. Christopher's Hospital for Children. Children's Seashore Home, Atlantic City, N. J.

1896. Beyea, Henry D., M.D., Associate in Gynecology and Assistant Demonstrator of Obstetrics in the University of Pennsylvania; Assistant Surgeon to the Gynecean Hospital. 1734 Spruce St.

†1884. Biddle, Alexander W., M.D. Chestnut Hill.

1884. Biddle, Thomas, M.D. 122 S. Twenty-second St.

*1903. Biggs, Montgomery H., M.D., Surgeon to the Rutherford Hospital; First Lieutenant, Medical Reserve Corps, U. S. Army.

1908. Bland, Pascal Brooke, M.D., Chief Clinical Assistant in the Gynecological Department of the Jefferson Medical College Hospital; Instructor in Gynecology in the Jefferson Medical College; Gynecologist to St. Joseph's Hospital; Assistant Gynecologist to the Philadelphia General Hospital. 1621 Spruce St.

ELECTED

1894. Bochroch, Max H., M.D., Demonstrator of Neurology and Chief Clinical Assistant in the Nervous Department of the Jefferson Medical College Hospital; Neurologist to the Out-patient Department of St. Joseph's Hospital. 1539 Pine St.

1896. Boger, John A., A.M., M.D., Surgeon to St. Mary's Hospital; Surgeon to the Stetson Hospital; Surgeon to the Dispensary of the Episcopal Hospital. 2213 N. Broad St.

1910. Boice, J. Morton, A.B., M.D., Gynecologist to the Out-patient Department of St. Joseph's Hospital; Lecturer on Chemistry to the Training School of St. Joseph's Hospital. 4020 Spruce St.

1911. Bonney, Charles W., A.B., M.D., Demonstrator of Applied Anatomy in the Jefferson Medical College; Assistant Surgeon, Department of Oral Surgery, Philadelphia General Hospital. 1117 Spruce St.

1913. Boston, L. Napoleon, A.M., M.D., Professor of Physical Diagnosis in the Medico-Chirurgical College; Physician to the Philadelphia General Hospital; Pathologist to the Frankford Hospital. 1819 Chestnut St.

1891. Boyd, George M., M.D., Professor of Obstetrics in the Medico-Chirurgical College; Obstetrician to the Medico-Chirurgical Hospital; Physician to the Philadelphia Lying-in Charity; Obstetrician and Gynecologist to the Philadelphia General Hospital. 1909 Spruce St.

1907. Boyer, Henry Percival, M.D., Physician to the Stetson Hospital; Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Chief Medical Inspector Pennsylvania Department of Health. 4602 Baltimore Ave.

†1884. Bradford, T. Hewson, M.D., Medical Director of the Philadelphia Life Insurance Company; Medical Director of the United Security Life Insurance and Trust Company. 1802 De Lancey Place.

1907. Bradley, William N., Ph.G., M.D., Physician to the Out-patient Department of the Children's Hospital; Assistant Physician to the Out-patient Department of the Pennsylvania Hospital; Physician to the Dispensaries of the Starr Centre. 1638 S. Broad St.

1903. Branson, Thomas F., M.D., Attending Physician to the Bryn Mawr Hospital. Rosemont, Pa.

ELECTED

1891. Brinton, Lewis, M.D., Physician-in-Chief to the American Hospital for Diseases of the Stomach. 1933 Spruce St.

1900. Brinton, Ward, A.M., M.D., Visiting Physician to the Tuberculosis Department of the Philadelphia General Hospital; Visiting Physician to the Hospital for Poor Consumptives at White Haven, Pa.; Visiting Physician to the Philadelphia Jewish Sanatorium for Consumptives. 1423 Spruce St.

1907. Brooks, Macy, A.B. (Princeton), M.D., Assistant Genito-urinary Surgeon to the Philadelphia General Hospital. 1314 Spruce St.

1887. Brubaker, Albert P., A.M., M.D., Professor of Physiology and Medical Jurisprudence in the Jefferson Medical College; Professor of Physiology and Hygiene in the Drexel Institute of Science, Art, and Industry. 105 N. Thirty-fourth St.

1906. Burns, Stillwell C., M.D., Lecturer on Surgery in the Medico-Chirurgical College; Assistant Surgeon to the Medico-Chirurgical Hospital. 1326 Spring Garden St.

1892. Burr, Charles W., M.D., Professor of Mental Diseases in the University of Pennsylvania; Neurologist to the Philadelphia General Hospital. 1918 Spruce St.

1906. Butler, Ralph, M.D., Professor of Diseases of the Nose and Throat in the Philadelphia Polyclinic and the College for Graduates in Medicine; Chief of the Dispensary for Diseases of the Ear at the University Hospital; Instructor in Otology in the University of Pennsylvania; Laryngologist and Aurist to the German Hospital. 1926 Chestnut St.

1912. Butt, William Redfield, M.D., Assistant Laryngologist to the Out-patient Department of the German Hospital; Chief of the Out-Patient Department for Diseases of the Ear, Nose, and Throat of the Howard Hospital; Demonstrator of Operative Rhinology in the Philadelphia Polyclinic. 1701 Chestnut St.

*1908. Cadbury, William W., A.M., M.D., University Medical School, Canton, China.

†1907. Cadwalader, Williams B., M.D., Pathologist and Clinical Assistant to the Orthopædic Hospital and Infirmary for Nervous Diseases; Assistant Instructor in Nervous Diseases in the Philadelphia Polyclinic. 1710 Locust St.

ELECTED

1905. Cameron, George A., M.D., Physician to the Germantown Hospital. S. E. cor. Schoolhouse Lane and Greene St., Germantown.

1905. Carmany, Harry S., M.D., Surgeon to St. Timothy's Hospital, Roxborough; Surgeon to the Dispensary of the Episcopal Hospital. 366 Green Lane, Roxborough.

1910. Carnett, John Berton, M.D., Associate in Surgery in the University of Pennsylvania; Assistant Surgeon to the University and the Philadelphia General Hospitals; Surgeon to the Chestnut Hill Hospital; Consulting Surgeon to the Henry Phipps Institute, to the Phœnixville Hospital, and to the Eastern Pennsylvania Institution for the Feeble-minded and Epileptic. 123 S. Twentieth St.

1905. Carpenter, Herbert B., M.D., Physician to the Dispensary of the Children's Hospital. 1805 Spruce St.

1895. Carpenter, John T., M.D., Lecturer on Ophthalmology in the University of Pennsylvania; Assistant Ophthalmic Surgeon to the University Hospital; Attending Ophthalmologist to the Bryn Mawr Hospital. 2040 Chestnut St.

1892. Cattell, Henry W., A.M., M.D., Editor of *International Clinics*, of *Medical Notes and Queries*. 3709 Spruce St.

1900. Chance, Burton, M.D., Assistant Surgeon to the Wills Eye Hospital; Ophthalmic Surgeon to the Pennsylvania Railroad Company. 235 S. Thirteenth St.

*1868. Cheston, D. Murray, M.D. Harwood P. O., Md.

1897. Cheston, Radcliffe, M.D., Visiting Physician to the Chestnut Hill Hospital; Consulting Physician to the Germantown Hospital, and to the Pennsylvania Institution for the Deaf and Dumb. Chestnut Hill.

1904. Christian, Hilary M., M.D., Clinical Professor of Genito-urinary Diseases in the Medico-Chirurgical College. 1321 Spruce St.

1903. Chrystie, Walter, M.D. Bryn Mawr, Pa.

1899. Clark, John G., M.D., Professor of Gynecology in the University of Pennsylvania; Gynecologist-in-Chief to the University Hospital. 2017 Walnut St.

1897. Claxton, Charles, A.M., M.D. 5137 Morris St., Germantown.

1896. Cleveland, Arthur H., M.D., Clinical Professor of Laryngology in the Medico-Chirurgical College; Laryngologist to the Medico-Chirurgical Hospital; Laryngologist and Aurist to the Presbyterian Hospital, and to Pennsylvania Institution for Deaf and Dumb. 256 S. Fifteenth St.

ELECTED

1910. Cloud, J. Howard, M.D., Assistant Physician to the Bryn Mawr Hospital; Attending Physician to the Children's House of Bryn Mawr Hospital. 7 W. Lancaster Ave., Ardmore, Pa.

1903. Coates, George Morrison, A.B., M.D., Surgeon to the Out-Patient Department for Diseases of the Ear, Throat, and Nose of the Pennyslvania Hospital; Professor of Diseases of the Ear in the Philadelphia Polyclinic; Laryngologist to the Tuberculosis Department of the Philadelphia General Hospital; Consulting Laryngologist to the Philadelphia Orphanage. 1736 Pine St.

1908. Codman, Charles A. E., M.D., Physician to the American Oncologic Hospital. 4116 Spruce St.

1907. Cohen, Myer Solis, A.B., M.D., Pediatrist to the Jewish Hospital, and to the Philadelphia Jewish Sanatorium for Consumptives, Eagleville, Pa.; Assistant Visiting Physician to the Philadelphia General Hospital; Consulting Physician to the Home for Consumptives, Chestnut Hill. 4102 Girard Ave.

1888. Cohen, Solomon Solis, M.D., Professor of Clinical Medicine in the Jefferson Medical College; Physician to the Jefferson Medical College Hospital, to the Philadelphia General Hospital, to the Jewish Hospital, and to the Rush Hospital. 1525 Walnut St.

1898. Coles, Stricker, M.D., Assistant Professor of Obstetrics in the Jefferson Medical College; Assistant Obstetrician to the Jefferson and the Philadelphia General Hospitals; Visiting Physician to the Philadelphia Lying-in-Charity Hospital. 2103 Walnut St.

1901. Coley, Thomas Luther, A.B., M.D., Attending Physician Methodist Episcopal Hospital, Philadelphia. 256 S. Fifteenth St.

1903. Coplin, W. M. L., M.D., Professor of Pathology in the Jefferson Medical College; Pathologist to and Director of the Laboratories of the Jefferson Medical College Hospital; Pathologist to the Philadelphia General Hospital and to the Friends' Asylum for the Insane, Frankford; Bacteriologist to the Pennsylvania State Board of Health. 606 S. Forty-eighth St.

1912. Copp, Owen, A.B., M.D., Physician-in-chief and Superintendent of the Pennsylvania Hospital for the Insane. Pennsylvania Hospital for the Insane, Forty-fourth and Market Streets.

ELECTED

1911. Cornell, Walter Stewart, A.B., M.D., Director of Medical Inspection of Public Schools of the City of Philadelphia; Chief of Medical Staff of the House of Detention; Lecturer on Osteology in the University of Pennsylvania; Lieutenant, Medical Reserve Corps, U. S. A. 729 City Hall.

1914. Corson, Edward Foulke, M.D., Physician for Diseases of the Skin, Presbyterian Hospital Dispensary; Assistant Dermatologist, Children's Hospital Dispensary. Cynwyd, Pa.

1907. Council, Malcolm S., M.D., Attending Physician to the Bryn Mawr Hospital; Attending Physician to the Cathcart Home at Devon. Bryn Mawr, Pa.

*1909. Craig, Alexander R., A.M., M.D. 535 N. Dearborn St., Chicago, Ill.

1904. Craig, Frank A., M.D., Instructor in Medicine in the University of Pennsylvania; Visiting Physician to the Henry Phipps Institute, University of Pennsylvania; Visiting Physician to the White Haven Sanatorium; Physcian-in-Charge of the Tuberculosis Class of the Presbyterian Hospital. 2030 Chestnut St.

1907. Crampton, George S., M.D. 1700 Walnut St.

1904. Cruice, John M., M.D., Physician to the Henry Phipps Institute of the University of Pennsylvania; Physician to the Medical Dispensary of St. Agnes' Hospital; Instructor in Medicine in the University of Pennsylvania. 1815 Spruce St.

*1910. Cummins, W. Taylor, M.D., Pathologist to the Southern Pacific Hospital; Director of the Mary W. Harriman Research Laboratory, San Francisco, Cal.

1902. Currie, Charles A., M.D., Physician to the Germantown Hospital. West Walnut Lane, Germantown.

1903. Da Costa, John C., Jr., M.D., Associate Professor of Medicine in the Jefferson Medical College; Assistant Physician to the Jefferson Medical College Hospital; Hematologist to the German Hospital; Consulting Physician to the Northwestern General Hospital. 264 S. Fifteenth St.

1896. Da Costa, John Chalmers, M.D., Professor of the Principles of Surgery and of Clinical Surgery in the Jefferson Medical College; Surgeon to the Philadelphia General and St. Joseph's Hospitals. 2045 Walnut St.

1887. Daland, Judson, M.D., Professor of Clinical Medicine in the Medico-Chirurgical College; Physician to the Medico-Chirurgical Hospital. 317 S. Eighteenth St.

ELECTED

1859. Darrach, James, M.D., Consulting Surgeon to the Germantown Hospital. 5923 Greene St., Germantown.

1896. Davis, Charles N., M.D., Dermatologist to the Pennsylvania Hospital; Consulting Dermatologist to St. Agnes' Hospital; Assistant Physician to the Dispensary for Skin Diseases in the Howard Hospital. 1931 Spruce St.

1888. Davis, Edward P., A.M., M.D., Professor of Obstetrics in the Jefferson Medical College and in the Philadelphia Polyclinic; Visiting Obstetrician to the Jefferson and the Polyclinic Hospitals; Obstetrician and Gynecologist to the Philadelphia General Hospital. 250 S. Twenty-first St.

1889. Davis, Gwilym G., M.D. (Univ. of Penna. and Göttingen), LL.D., M.R.C.S. (Eng.), Professor of Orthopedic Surgery in the University of Pennsylvania; Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases; Orthopedic Surgeon to the Philadelphia General Hospital; Consulting Surgeon to St. Joseph's Hospital. 1814 Spruce St.

1900. Davisson, Alex. Heron, M.D. 31 St. Paul's Rd., Ardmore.

1894. Deaver, Harry C., M.D., Professor of Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Episcopal Hospital, and to the Children's Hospital of the Mary J. Drexel Home; Surgeon-in-Chief to the Kensington Hospital for Women. 1534 N. Fifteenth St.

1887. Deaver, John B., M.D., D.Sc., LL.D., Professor of the Practice of Surgery in the University of Pennsylvania; Surgeon-in-Chief to the German Hospital. 1634 Walnut St.

1902. Dehoney, Howard, M.D. 237 S. Thirteenth St.

1885. Dercum, Francis X., A.M., M.D., Ph.D., Professor of Nervous and Mental Diseases in the Jefferson Medical College; Consulting Neurologist to the Philadelphia General Hospital; Foreign Corresponding Member of the Neurological Society of Paris, and Corresponding Member of the Psychiatric and Neurological Society of Vienna. 1719 Walnut St.

1908. Despard, Duncan L., M.D., Surgeon to the Abington Memorial Hospital; Assistant Surgeon to the Jefferson Medical College Hospital; Demonstrator of Clinical Surgery in the Jefferson Medical College; Associate in Gynæcology in the Philadelphia Polyclinic Hospital. 1806 Pine St.

1912. Dewey, J. Hiland, Ph.B., M.D., Assistant Surgeon to Wills Eye Hospital; Ophthalmic Surgeon to St. Francis' Hospital, Trenton, N. J. 1436 Diamond St.

ELECTED

1911. Dickson, Frank D., M.D., Instructor in Orthopedic Surgery in the University of Pennsylvania; Assistant Orthopedic Surgeon to the University Hospital; Assistant Surgeon to the Orthopædic Hospital; Assistant Orthopedic Surgeon to the Philadelphia General Hospital. 1814 Spruce Street.

1908. Dillard, Henry K., Jr., M.D., Physician to the Out-patient Department of the Pennsylvania Hospital; Physician to the Dispensary of the Mary J. Drexel Home. 234 S. Twentieth St.

1891. Dixon, Samuel G., M.D., LL.D., Commissioner of Health of Pennsylvania; President of the Academy of Natural Sciences of Philadelphia; Member of the Philadelphia Bar. Bryn Mawr, Pa.

*1897. Dorland, W. A. Newman, M.D., Professor of Gynecology in the Post-graduate Medical School of Chicago; Professor of Obstetrics in the Medical Department of Loyola University; Visiting Obstetrician to Cook County Hospital; First Lieutenant, Medical Reserve Corps, U. S. Army. 1422 W. Jackson Boulevard, Chicago, Ill.

1907. Dorrance, George Morris, M.D., Surgeon to St. Agnes' Hospital; Demonstrator of Applied Anatomy in the Dental Department of the University of Pennsylvania. 2025 Walnut St.

1893. Downs, Norton, M.D., Fordhooke Farms, Three Tuns, Pa.

1864. Downs, R. N., M.D., Consulting Physician to the Germantown Hospital. 5916 Greene St., Germantown.

1902. Downs, Robert N., Jr., M.D., Surgeon to the Dispensary of the Germantown Hospital. 6008 Greene St., Germantown.

1910. Drayton, William, Jr., M.D., Physician to the Philadelphia Hospital for Contagious Diseases; Physician to the Out-patient Department of the Pennsylvania Hospital; Physician to the Pennsylvania Institute for the Instruction of the Blind; Assistant Physician to the Philadelphia Orthopædic Hospital and Infirmary for Nervous Diseases. 1316 Locust Street.

1864. Duer, Edward L., A.M., M.D., Consulting Gynecologist to the Presbyterian Hospital; Consulting Obstetrician to the Maternity Hospital and the Preston Retreat. 1606 Locust St.

1881. Dulles, Charles Winslow, M.D., Consulting Surgeon of the Rush Hospital. 4101 Walnut St.

ELECTED

1911. Earnshaw, Henry Culp, M.S., M.D., Attending Physician to the Hospital of the Good Shepherd, Rosemont; Assistant Attending Physician to the Bryn Mawr Hospital; Attending Physician to the Bryn Mawr Children's Hospital; Pennsylvania Railroad Surgeon. Bryn Mawr, Pa.

*1887. Edwards, William A., M.D., Professor of Pediatrics in the Medical Department of the University of California. Fifth and Spring Sts., Los Angeles, Cal.

1911. Eliason, Eldridge E., B.A., M.D., Assistant Instructor in Surgery in the University of Pennsylvania; Assistant Surgeon to the University Hospital; Assistant Surgeon to the Howard Hospital; Surgeon to the Out-patient Department of the Children's Hospital. 320 S. Sixteenth Street.

1904. Elmer, Walter G., B.S., M.D., Instructor in Orthopedic Surgery in the University of Pennsylvania; Assistant Orthopedic Surgeon to the University Hospital; Orthopedic Surgeon to the Jewish Hospital; Surgeon to the Pennsylvania Training School for Children. 1801 Pine Street.

1896. Ely, Thomas C., A.M., M.D. 2041 Green St.

1901. Erck, Theodore A., M.D., Associate in Gynecology in the Philadelphia Polyclinic and College for Graduates in Medicine; Associate Surgeon to the Gynecean Hospital. 251 S. Thirteenth St.

1893. Eshner, Augustus A., M.D., Professor of Clinical Medicine in the Philadelphia Polyclinic and College for Graduates in Medicine; Physician to the Philadelphia General Hospital; Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Consulting Physician to Mercy Hospital. 1019 Spruce St.

*1905. Evans, Joseph S., Jr., A.B., M.D., Professor of Clinical Medicine and Students' Physician in the University of Wisconsin. University of Wisconsin, Madison, Wis.

1905. Evans, William, M.D. 4007 Chestnut St.

1912. Eves, Curtis C., M.D., Aural and Laryngeal Surgeon to the Episcopal Hospital; Assistant in the Out-patient Department for Diseases of the Ear, Throat, and Nose of the Pennsylvania Hospital; Demonstrator of Operative Surgery of the Ear, Nose, and Throat in the Philadelphia Polyclinic. 302 S. Nineteenth St.

ELECTED

1894. Faries, Randolph, M.D. 2007 Walnut St.

†1903. Farr, Clifford B., A.B., M.D., Professor of Diseases of the Stomach, etc., in the Philadelphia Polyclinic; Instructor in Medicine in the University of Pennsylvania; Assistant Physician to the Philadelphia General Hospital; Pathologist to the Presbyterian Hospital. 117 S. Twenty-second Street.

1893. Farr, William W., M.D., Physician to the Leamy Home. Springfield Ave. and Lincoln Drive, Chestnut Hill.

1884. Fenton, Thomas H., M.D., Ophthalmologist to St. Vincent's Home, to the Home for Aged Couples, to the Baptist Home, and to the House of the Good Shepherd. 1319 Spruce St.

1907. Ferguson, Albert D., M.D., Physician-in-charge of the Widener Memorial School for Crippled Children. 50 E. Johnson St., Germantown.

1907. Fetterolf, George, A.B., M.D., Sc.D., Laryngologist to the Henry Phipps Institute for Tuberculosis; Laryngologist to the White Haven Sanatorium; Consulting Laryngologist to the Phœnixville Hospital; Demonstrator of Anatomy in the University of Pennsylvania. 330 S. Sixteenth St.

1907. Fife, Charles A., A.B., M.D., Instructor in Pediatrics in the University of Pennsylvania; Pediatrist to the Presbyterian Hospital; Physician to the St. Christopher's Hospital for Children; Assistant Physician to the Philadelphia General Hospital. 2033 Locust St.

1884. Fisher, Henry M., M.D. 1027 Pine St.

1910. Fisher, John Monroe, M.D., Associate Professor of Gynecology in the Jefferson Medical College; Gynecologist to the Philadelphia, St. Agnes', and Phœnixville Hospitals; Assistant Gynecologist to the Jefferson Medical College Hospital. 222 S. Fifteenth St.

1888. Flick, Lawrence F., M.D. 736 Pine St.

1908. Foulkrod, Collin, M.D., Obstetrician to the Maternity House of the Presbyterian Hospital; Assistant Demonstrator of Obstetrics in Jefferson Medical College; Gynecologist to the Dispensary of the Presbyterian Hospital. 4005 Chestnut St.

1908. Fox, Herbert, M.D., Director of the William Pepper Laboratory of Clinical Medicine, University of Pennsylvania;

ELECTED

Pathologist to the Laboratory of Comparative Pathology of the Zoölogical Society of Philadelphia; Pathologist to the Rush Hospital. 3902 Locust St.

†1885. Fox, Joseph M., M.D. Torresdale, Pa.

1906. Fraley, Frederick, Jr., A.B., M.D. 1701 De Lancey Place.

1903. Francine, Albert Philip, A.M., M.D., Associate in Medicine in the University of Pennsylvania; Visiting Physician to the Philadelphia General Hospital, Department of Tuberculosis; Physician-in-Chief to the State Dispensary for Tuberculosis, Philadelphia. 1932 Spruce St.

1897. Frazier, Charles H., M.D., Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the University, the Philadelphia General, and the Episcopal Hospitals; Surgeon to the Home for Crippled Children. 1724 Spruce St.

†1890. Freeman, Walter J., M.D., Emeritus Professor of Laryngology in the Philadelphia Polyclinic; Laryngologist to the Orthopædic Hospital; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb. 1832 Spruce St.

*1910. Frescoln, Leonard D., A.B., M.D., United States Physician Indian Service; First Lieutenant, Army Medical Reserve. Browning, Montana.

1910. Furbush, Charles Lincoln, M.D. 1501 Spruce St.

1889. Fussell, M. Howard, M.D., Professor of Applied Therapeutics in the University of Pennsylvania; Physician to the University Hospital, the Episcopal Hospital, St. Timothy's Hospital, and St. Mary's Hospital. 2035 Walnut St.; 421 Lyceum Ave., Roxborough.

1899. Gamble, Robert G., M.D., one of the Attending Physicians to the Bryn Mawr Hospital. Haverford, Pa.

1912. Gaskill, Henry Kennedy, M.D., Assistant Professor of Dermatology in the Jefferson Medical College; Assistant Dermatologist to the Philadelphia General Hospital. 1610 Spruce St.

1873. Gerhard, George S., M.D., Physician-in-Chief to the Bryn Mawr Hospital; Consulting Physician to Bryn Mawr College; Consulting Physician to Villa Nova College. Fifty-eighth Street and Overbrook Ave.

1902. Ghriskey, Albert A., M.D. 3936 Walnut St.

ELECTED

1899. Gibbon, John H., M.D., Professor of Surgery in the Jefferson Medical College; Surgeon to the Pennsylvania and the Bryn Mawr Hospitals. 1608 Spruce St.

1908. Gildersleeve, Nathaniel, M.D., Associate in Bacteriology in the University of Pennsylvania; Pathologist to the Bar Harbor Medical and Surgical Hospital, Bar Harbor, Me. Dormitories, University of Pennsylvania.

1913. Ginsburg, Nathaniel, M.D., Surgeon to the Jewish Hospital; Associate in Surgery in the Philadelphia Polyclinic and College for graduates in Medicine; Assistant Surgeon to Mt. Sinai Hospital; Instructor in Anatomy in the University of Pennsylvania. 1704 Pine St.

1897. Girvin, John H., M.D., Physician for Diseases of Women at the Presbyterian Hospital; Instructor in Obstetrics in the University of Pennsylvania. 2120 Walnut St.

1906. Gittings, J. Claxton, M.D., Instructor in Pediatrics in the University of Pennsylvania; Assistant Pediatric Physician to the University Hospital; Visiting Physician to the Children's Hospital of the Mary J. Drexel Home, and to the Out-patient Department of the Presbyterian Hospital. 3942 Chestnut St.

1905. Given, Ellis E. W., M.D., Surgeon to the Dispensary of the Episcopal Hospital. 2714 Columbia Avenue.

1894. Gleason, E. B., S.B., M.D., LL.D., Professor of Otology in the Medico-Chirurgical College. 2033 Chestnut St.

1906. Goepp, R. Max, M.D., Professor of Clinical Medicine, Dean of the College Department, and Secretary of the Faculty of the Philadelphia Polyclinic and College for Graduates in Medicine; Assistant Professor of Clinical Medicine in the Jefferson Medical College; Assistant Visiting Physician to the Philadelphia General Hospital. 1716 Locust St.

1906. Goldberg, Harold G., M.D., Curator and Pathologist to the Wills Eye Hospital; Assistant Ophthalmic Surgeon to the Episcopal Hospital; First Lieutenant, Medical Reserve Corps, U. S. Army. 1925 Chestnut St.

1893. Goodell, W. Constantine, M.D. 300 S. Thirteenth St.

1908. Goodman, Edward H., M.D., Associate in Medicine in the University of Pennsylvania; Consultant to the Medical Dispensary of the University Hospital; Assistant Physician to the University Hospital; Assistant Physician to the Philadelphia General Hospital. 248 S. Twenty-first St.

ELECTED

1905. Gordon, Alfred, M.D., Neurologist to the Mt. Sinai, the Northwestern General, and the Douglass Memorial Hospitals. 1812 Spruce. St.

†1897. Gould, George M., A.M., M.D. 401 Oriental Ave., Atlantic City, N. J.

1894. Graham, Edwin E., M.D., Professor of Pediatrics in the Jefferson Medical College; Pediatrist to the Jefferson and the Philadelphia General Hospitals; Physician to the Franklin Reformatory Home. 1713 Spruce St.

1885. Graham, John, M.D. 326 S. Fifteenth St.

1904. Grayson, Charles P., M.D., Professor of Laryngology and Rhinology in the University of Pennsylvania; Physician-in-Charge of the Throat and Nose Department of the University Hospital; Otolaryngologist to the Philadelphia General Hospital. 1435 Spruce St.

1910. Greenman, Milton J., M.D., Sc.D., Director of the Wistar Institute of Anatomy and Biology. Wistar Institute of Anatomy and Biology, Thirty-sixth St. and Woodland Ave.

1883. Griffith, J. P. Crozer, M.D., Professor of Diseases of Children in the University of Pennsylvania; Corresponding Member of the Société de Pédiatrie de Paris. 1810 Spruce St.

1912. Griscom, J. Milton, B.S., M.D., Assistant Surgeon to the Wills Eye Hospital; Chief of Clinic of the Eye Dispensary of the Presbyterian Hospital. 1925 Chestnut St.

1911. Gummey, Frank Bird, M.D., Visiting Physician to the Germantown Hospital and Dispensary; Visiting Physician to the Midnight Mission. 5418 Greene St., Germantown.

1902. Gwyn, Norman B., M.D., Instructor in Medicine in the University of Pennsylvania. 20 S. Twenty-first St.

1894. Hamill, Samuel McC., M.D., Professor of Diseases of Children in the Philadelphia Polyclinic and College for Graduates in Medicine; Pediatrist to the Presbyterian Hospital; Pediatrist to St. Vincent's Home. 1822 Spruce St.

1897. Hand, Alfred, Jr., M.D., Visiting Physician to the Children's Hospital, to the Children's Hospital of the Mary J. Drexel Home, and to the Methodist Hospital. 1724 Pine St.

ELECTED

1886. Hansell, Howard F., M.D., Professor of Ophthalmology in the Jefferson Medical College; Ophthalmic Surgeon to the Philadelphia General Hospital and to the Jefferson Medical College Hospital; Emeritus Professor of Diseases of the Eye in the Philadelphia Polyclinic. 1528 Walnut St.

1889. Hare, Hobart A., M.D., Professor of Therapeutics, Materia Medica, and Diagnosis in the Jefferson Medical College, 1801 Spruce St.

1903. Hart, Charles D., M.A., M.D., Inspector of the Eastern Penitentiary; Consulting Physician to the Pennsylvania Institution for the Instruction of the Blind; Chairman of the Medical Section of the Philadelphia Vice Commission. 1317 Walnut St.

1885. Harte, Richard H., M.D., Adjunct Professor of Surgery in the University of Pennsylvania; Surgeon to the Pennsylvania and the Orthopædic Hospitals; Consulting Surgeon to St. Mary's, St. Timothy's, and the Bryn Mawr Hospitals. 1503 Spruce St.

1888. Hartzell, Milton B., M.D., LL.D., Professor of Dermatology in the University of Pennsylvania; Clinical Professor of Dermatology in the Woman's Medical College of Pennsylvania. 3644 Chestnut St.

1907. Hatfield, Charles James, A.B. (Princeton), M.D., Executive Director of the Henry Phipps Institute for the Study, Treatment, and Prevention of Tuberculosis; Visiting Physician to the White Haven Sanatorium. 2008 Walnut Street.

1872. Hays, I. Minis, M.D. 266 S. Twenty-first St.

1911. Heed, Charles R., M.D., Associate in Ophthalmology in the Philadelphia Polyclinic; Assistant Surgeon to the Wills Eye Hospital; Instructor in Ophthalmology in the Jefferson Medical College. 1402 Spruce St.

1908. Heineberg, Alfred, M.D., Associate in Gynecology in the Jefferson Medical College; Assistant Gynecologist to St. Agnes' and to Mt. Sinai Hospitals. 1642 Pine St.

1901. Heisler, John C., M.D., Professor of Anatomy in the Medico-Chirurgical College. 3829 Walnut St.

1884. Henry, Frederick P., A.M., M.D., Professor of the Principles and Practice of Medicine in the Woman's Medical College of Pennsylvania; Physician to the Philadelphia General Hospital. 114 S. Eighteenth St.

ELECTED

1903. Henry, J. Norman, M.D., Physician to the Pennsylvania Hospital; Clinical Professor of Medicine in the Woman's Medical College of Pennsylvania; Assistant Physician to the Philadelphia General Hospital. 1906 Spruce St.

1891. Hewson, Addinell, A.B., A.M., M.D., Professor of Anatomy in the Philadelphia Polyclinic and College for Graduates in Medicine; Professor of Anatomy and Histology in the Temple University; Surgeon to St. Timothy's Hospital, Roxborough. 2120 Spruce St.

1909. Higbee, William S., M.D., President of the Pennsylvania State Board of Examiners for Registration of Nurses. 1703 S. Broad St.

1910. Hill, Howard Kennedy, M.D., Assistant Instructor in Medicine in the University of Pennsylvania; Physician to the Children's Medical Dispensary of the Presbyterian Hospital; Visiting Physician to the University Settlement, and to the Day Nursery; Assistant Physician to the Medical Dispensary of the Children's Hospital. 339 S. Eighteenth St.

1897. Hinkle, William M., M.D., Lecturer on the Anatomy and Physiology of the Vocal Organs in the National School of Elocution and Oratory. 1323 N. Thirteenth St.

*1892. Hinsdale, Guy, A.M., M.D., Associate Professor of Climatology in the Medico-Chirurgical College, Philadelphia. Hot Springs, Virginia.

1888. Hirsh, A. Bern, M.D., Physician to the Home for Aged Couples. 22 S. Twenty-first St.

1888. Hirst, Barton Cooke, M.D., Professor of Obstetrics in the University of Pennsylvania; Gynecologist to the Philadelphia General and the Howard Hospitals. 1821 Spruce Street.

1903. Hirst, John Cooke, M.D., Assistant Obstetrician to the University and the Philadelphia General Hospitals; Attending Physician to the Maternity Hospital and to the Gynecological Dispensary of the Howard Hospital; Consulting Obstetrician to the Southeastern Dispensary. 1823 Pine St.

1908. Hitchens, Arthur Parker, M.D. Glenolden, Pa.

1905. Hodge, Edward Blanchard, A.B., M.D., Surgeon to the Presbyterian and the Children's Hospitals; Surgeon to the Out-patient Department of the Pennsylvania Hospital; Surgeon to the Widener Memorial School. 346 S. Sixteenth Street.

ELECTED

1913. Hoffman, Clarence, M.D., 425 S. Carlisle St.

1885. Holland, James W., A.M., M.D., Sc.D., Emeritus Professor of Medical Chemistry and Toxicology and Dean of the Jefferson Medical College. 2006 Chestnut St.

1906. Holloway, Thomas B., M.D., Instructor in Ophthalmology in the University of Pennsylvania; Assistant Ophthalmologist to the Orthopædic Hospital and Infirmary for Nervous Diseases; Ophthalmologist to the Pennsylvania Institution for the Instruction of the Blind; Consulting Ophthalmologist to the Henry Phipps Institute. 1819 Chestnut St.

1914. Hooker, Richard S., M.D. 2116 N. Hancock St.

1908. Hoyt, Daniel M., M.D., Assistant Visiting Physician to the Philadelphia General Hospital. 3604 Chestnut St.

*1912. Huber, G. Carl, M.D., Professor of Anatomy and Director of the Anatomic Laboratories in the University of Michigan. 1330 Hill St., Ann Arbor, Mich.

1892. Hughes, William E., M.D., Visiting Physician to the Philadelphia General Hospital; Pathologist to the Presbyterian Hospital. 3945 Chestnut St.

1912. Hunter, John W., B.S., M.D. 2042 Pine St.

1898. Hutchinson, James P., M.D., Surgeon to the Pennsylvania, the Methodist, the Children's, St. Timothy's, and the Bryn Mawr Hospitals; Adjunct Professor of Surgery in the University of Pennsylvania. 133 S. Twenty-second St.

1871. Ingham, James V., M.D. 1811 Walnut St.

*1885. Jackson, Edward, M.D., Professor of Ophthalmology in the University of Colorado; Emeritus Professor of Diseases of the Eye in the Philadelphia Polyclinic; Ophthalmologist to the Denver City and County Hospital. 318 Majestic Building, Denver, Col.

1906. Jacobs, Francis Brinton, B.S., M.D., Pediatrist to the Howard Hospital; Pediatrist to the American Hospital for Diseases of the Stomach; Visiting Physician to the Philadelphia Orphan Asylum; Assistant in the Laboratory of the Polyclinic Hospital. Downingtown, Pa.

1913. Jefferys, William Hamilton, A.B., A.M., M.D., Surgeon to St. Luke's Hospital, Shanghai; Professor of Surgery in St. John's University, Shanghai; Editor of the China Medical Journal. 100 W. Walnut Lane, Germantown.

ELECTED

1898. Johnson, Russell H., A.B. (Princeton), M.D., Physician to the Pennsylvania Institution for the Deaf and Dumb. Chestnut Hill, Philadelphia.

1900. Jones, Charles James, A.M., M.D., LL.D., Ophthalmic Surgeon to St. Joseph's Hospital; Ophthalmic Surgeon to the House of the Good Shepherd, Germantown; Consulting Ophthalmologist to St. Vincent's Home. 1507 Locust Street.

1914. Jones, Isaac H., M.D. 1831 Chestnut St.

1913. Jones, John F. X., B.S., A.B., A.M., M.D., Assistant Surgeon to St. Joseph's Hospital; Assistant Surgeon to the Philadelphia General Hospital. 1831 Chestnut St.

1900. Jopson, John H., M.D., Professor of Surgery in the Philadelphia Polyclinic; Associate in Surgery in the University of Pennsylvania; Surgeon to the Presbyterian and the Children's Hospitals. 1824 Pine St.

1900. Judson, Charles F., A.B., M.D., Physician to St. Christopher's Hospital for Children, to the Southern Home for Destitute Children and to the Sheltering Arms. 1005 Spruce Street.

1902. Jump, Henry D., M.D., Instructor in Medicine in the University of Pennsylvania; Assistant Physician to the Medical Dispensary of the University Hospital. 4634 Chester Ave.

1886. Jurist, Louis, M.D. 916 N. Broad St.

1903. Kalteyer, Frederick J., M.D., Demonstrator of Clinical Medicine in the Jefferson Medical College; Chief of the Out-patient Department, Assistant Attending Physician, and Hematologist to the Jefferson Medical College Hospital; Pathologist to Philadelphia Lying-in-Charity. 1533 Pine Street.

*1910. Karsner, Howard T., M.D., Professor of Pathology in the Western Reserve University Medical School. Lakeside Hospital, Cleveland, Ohio.

†1867. Keen, William W., M.D., LL.D., (Hon.) F.R.C.S. (Eng. and Edin.), Emeritus Professor of the Principles of Surgery and of Clinical Surgery in the Jefferson Medical College; Membre Correspondant Etranger de la Société de Chirurgie de Paris; Honorary Member of the Société Belge de Chirurgie and of the Clinical Society of London; Ehren mitglied der deutschen Gesellschaft für Chirurgie. 1729 Chestnut St.

ELECTED

1912. Keene, Floyd E., M.D., Instructor in Gynecology in the University of Pennsylvania; Assistant Gynecologist to the University Hospital; Gynecologist to the Chestnut Hill Hospital. 116 S. Nineteenth St

1913. Kelly, Francis Joseph, M.D. 1809 Chestnut St.

*1887. Kelly, Howard A., A.B., M.D., LL.D. (Aberdeen, Wash. and Lee, and Univ. of Pa.), Professor of Gynecology in Johns Hopkins University and Gynecologist to the Johns Hopkins Hospital, Baltimore, Md.; Hon. Fellow of the Edinburgh Obstetrical Society, the Royal Academy of Medicine of Ireland, and of the Glasgow Obstetrical and Gynecological Society. 1406 Eutaw Place, Baltimore, Md.

1909. Kelly, James A., A.M., M.D., Visiting Surgeon to St. Mary's and St. Timothy's Hospitals; Associate in Surgery in the Philadelphia Polyclinic and College for Graduates in Medicine; Assistant Visiting Surgeon to St. Joseph's Hospital. 1510 N. Seventeenth St.

1912. Kelly, Thomas C., A.M., M.D., Assistant Instructor of Medicine in the University of Pennsylvania; Pediatrician to St. Mary's Hospital; Physician to Out-patient Department of Germantown Hospital. 105 School Lane, Germantown.

1898. Kempton, Augustus F., M.D. 2118 Pine St.

1905. Kercher, Delno E., M.D. 1534 Pine St.

*1907. Kinyoun, Joseph J., M.D. (Georgetown), Professor of Pathology and Bacteriology in the George Washington University. 1423 Clifton St., Washington, D.C.

1910. Klaer, Fred Harlen, A.B., M.D., Instructor in Medicine in the University of Pennsylvania; Physician-in-Charge of the Medical Dispensary of the University Hospital; Consulting Physician to the Chester County Hospital, West Chester, Pa. 1805 Pine St.

1913. Klopp, Edward J., M.D. 1223 Spruce St.

1895. Kneass, Samuel S., M.D., Associate in the William Pepper Laboratory of Clinical Medicine in the University of Pennsylvania. 1510 Walnut St.

1908. Knipe, Jay C., M.D., Ophthalmologist to the Jewish Hospital; Assistant Ophthalmologist to the Philadelphia General Hospital, and to the Mary J. Drexel Home; Chief of the Eye Clinic at the Jefferson Medical College Hospital; Demonstrator of Osteology and Syndesmology in the Jefferson Medical College. 2035 Chestnut St.

ELECTED

1908. Knowles, Frank Crozier, M.D., Instructor in Dermatology in the University of Pennsylvania; Clinical Professor of Dermatology in the Woman's Medical College; Dermatologist to the Presbyterian Hospital; Assistant Dermatologist to the Dispensary of the Pennsylvania Hospital. 2022 Spruce St.

1914. Kolmer, John A., M.D., Instructor in Experimental Pathology in the University of Pennsylvania; Professor of Pathology and Pathologist to the Department of Dermatological Research, Philadelphia Polyclinic; Pathologist to the Philadelphia Hospital for Contagious Diseases; Serologist to St. Agnes' and St. Timothy's Hospitals. 927 S. St. Bernard St.

1904. Krauss, Frederick, M.D., Ophthalmic Surgeon to the Episcopal Hospital; Ophthalmic and Aural Surgeon to St. Christopher's Hospital for Children and Dispensary; Ear, Nose, and Throat Physician to the Children's Seashore House for Invalid Children, Atlantic City, N. J. 1701 Chestnut St.

1905. Kremer, Walter H., M.D., 5904 Greene St., Germantown.

1914. Krumbhaar, Edward B., A.B. (Harvard), M.D., Fellow in Research Medicine and Assistant Instructor in Medicine; University of Pennsylvania; Physician to Out-patient Department, Pennsylvania Hospital. W. Mermaid La., Chestnut Hill.

1900. Krusen, Wilmer, M.D., Professor of Gynecology in the Medical Department of Temple University; Chief Gynecologist to the Samaritan and the Garretson Hospitals; Consulting Gynecologist to the Charity and Mercy Hospitals. 127 N. Twentieth St.

1897. Kyle, D. Braden, A.M., M.D., Professor of Laryngology in the Jefferson Medical College; Consulting Laryngologist, Rhinologist, and Otologist to St. Agnes' Hospital and to the Philadelphia Home for Incurables; Laryngologist to the New Jersey Training School for Feeble-minded Children; Bacteriologist to the Orthopædic Hospital and Infirmary for Nervous Diseases. 1517 Walnut St.

1913. Laird, John Lohra, A.B., M.D., Assistant Surgeon in Genito-Urinary Diseases to the University Hospital; Associate in Serology in the William Pepper Laboratory of Clinical Medicine in the University of Pennsylvania; Assistant Instructor in Genito-Urinary Surgery in the University of Pennsylvania. 247 S. Seventeenth St.

1909. Laird, J. Packard, M.D., Visiting Physician to the Devon Branch of Presbyterian Hospital of Philadelphia. Devon, Pa.

ELECTED

1904. Landis, Henry R. M., M.D., Director of the Clinical and Sociological Departments of the Henry Phipps Institute of the University of Pennsylvania; Assistant Professor in Medicine in the University of Pennsylvania; Visiting Physician to the White Haven Sanatorium. 11 S. Twenty-first St.

1907. Langdon, H. Maxwell, M.D., Instructor in Ophthalmology in the University of Pennsylvania; Assistant Surgeon to the Dispensary for Diseases of the Eye in the University Hospital; Assistant Ophthalmologist to the Orthopædic Hospital; Chief of the Dispensary for Diseases of the Eye of the Presbyterian Hospital. 2018 Chestnut St.

1887. Leaman, Henry, M.D. 832 N. Broad St.

1904. Le Boutillier, Theodore, M.D., Clinical Professor of Pediatrics in the Woman's Medical College of Pennsylvania; Physician to the Dispensary of St. Christopher's Hospital for Children; Pediatrist to the Woman's College Hospital Dispensary; Visiting Physician to the Baptist Orphanage and to the Southern Home for Destitute Children. 9 S. Twenty-first St.

1893. Le Conte, Robert G., A.B., M.D., Surgeon to the Pennsylvania and the Bryn Mawr Hospitals; Consulting Surgeon to Germantown and Gynecean Hospitals. 1530 Locust St.

1908. Lee, Walter Estell, M.D., Surgeon to the Gynecological Dispensary of the Pennsylvania Hospital; Assistant Surgeon to the Germantown and Bryn Mawr Hospitals; Surgeon to the Dispensary of the Episcopal Hospital and Children's Hospital; Surgeon to the Glen Mills Schools. 905 Pine Street.

1903. Leffmann, Henry, A.M., M.D., D.D.S., Ph.D., Professor of Chemistry in the Woman's Medical College of Pennsylvania; Honorary Professor of Chemistry in the Wagner Free Institute of Science; Pathological Chemist to the Jefferson Medical College Hospital. 1839 N. Seventeenth Street.

1892. Leidy, Joseph, M.D., Officer l'instruction publique, France; Consulting Physician to the Pennsylvania Training School for Feeble-minded Children. 1319 Locust St.

1909. L'Engle, Edward M., M.D. Jacksonville, Fla.

1877. Lewis, Morris J., M.D., Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases and to the Pennsylvania Hospital. 1316 Locust St.

ELECTED

1911. Lewis, Paul A., M.D., Director of the Pathological Department of the Henry Phipps Institute of the University of Pennsylvania; Assistant Professor of Pathology in the University of Pennsylvania; Director of the Ayer Clinical Laboratory of the Pennsylvania Hospital. Henry Phipps Institute, 238 Pine St.

1904. Lindauer, Eugene, M.D., Instructor of Neurology in the Medico-Chirurgical Hospital; Associate in Clinical Medicine in the Philadelphia Polyclinic; Assistant Neurologist to the Philadelphia General Hospital. 2018 N. Thirty-second St.

1886. Lloyd, J. Hendrie, A.M. (Princeton), M.D., Neurologist to the Philadelphia General Hospital, and to the Methodist Episcopal Hospital; Consulting Neurologist to the State Asylum for the Chronic Insane at Wernersville, and to the Pennsylvania Training School for Feeble-minded Children at Elwyn. 116 S. Twenty-first St.

1907. Lodholz, Edward, M.D., Demonstrator of Physiology in the University of Pennsylvania. 3103 Diamond St.

1893. Longaker, Daniel, M.D., Surgeon to the Jewish Maternity Hospital. 1402 N. Sixteenth St.

1907. Loux, Hiram R., M.D., Professor of Genito-Urinary Surgery in the Jefferson Medical College; Surgeon to the Philadelphia General Hospital. 1819 Walnut St.

1914. Lyon, B. B. Vincent, A.B. (Williams Coll.), M.D. 1901 Pine St.

1900. McCarthy, Daniel J., M.D., Professor of Medical Jurisprudence (George B. Wood Foundation) in the University of Pennsylvania; Neurologist to the Philadelphia General and St. Agnes' Hospitals, and to the Henry Phipps Institute. 2025 Walnut St.

1903. McConnell, Guthrie, M.D., Assistant Surgeon Medical Reserve Corps, U. S. N. Cynwyd, Pa.

1913. McCrea, Thomas, B.A., M.D., F.R.C.P. (Lond.), Professor of Medicine in the Jefferson Medical College; Physician to the Jefferson and Pennsylvania Hospitals. 1627 Spruce Street.

1895. McFarland, Joseph, M.D., Sc.D., Professor of Pathology and Bacteriology in the Medico-Chirurgical College; Pathologist to the Medico-Chirurgical Hospital and to the Philadelphia General Hospital. 442 W. Stafford St., Germantown.

ELECTED

1913. McGlinn, John A., B.A., M.D., Assistant Professor of Obstetrics in the Medico-Chirurgical College; Assistant Obstetrician to the Medico-Chirurgical Hospital; Gynecologist to St. Agnes' Hospital. 113 S. Twentieth St.

1905. McKenzie, Robert Tait, A.B., M.D., Professor of Physical Education and Director of the Department of Physical Education in the University of Pennsylvania. 26 S. Twenty-first St.

*1900. McReynolds, Robert Phillips, M.D. 213 S. Broadway, Los Angeles, Cal.

1886. MacCoy, Alexander W., M.D. Consulting Laryngologist to the Bryn Mawr Hospital. 216 S. Fifteenth St.

1910. MacKinney, William H., M.D., Assistant Surgeon to the Dispensary for Genito-urinary Diseases, University Hospital; Assistant in the Urological Dispensary of the German Hospital. 1701 Chestnut St.

1914. Maier, F. Hurst, M.D. 2035 Chestnut St.

1913. Major, C. Percy, M.D. Tenth and Oak Lane.

1896. Makuen, G. Hudson, M.D., Professor of Defects of Speech in the Philadelphia Polyclinic; Laryngologist and Otogist to the Chester Hospital; Consultant Laryngologist and Otologist to the Roosevelt and Frederick Douglass Hospitals; Consultant on Defects of Speech to the New Jersey Training School for Feeble-minded Children. 1627 Walnut Street.

1913. Manges, Willis F., M.D., Röntgenologist to the Jefferson Hospital; Director of the Röntgen Ray Laboratory in the Philadelphia General Hospital. 264 S. Sixteenth St.

1898. Marshall, George Morley, M.D., Laryngologist to the Philadelphia General Hospital; Laryngologist and Otologist to St. Joseph's Hospital. 1819 Spruce St.

1893. Marshall, John, M.D., Nat.Sc.D. (Tübingen), LL.D. Professor of Chemistry and Toxicology in the University of Pennsylvania. 1718 Pine St.

1889. Martin, Edward, M.D., John Rhea Barton Professor of Surgery in the University of Pennsylvania; Surgeon to the University, Howard, Philadelphia General, and Bryn Mawr Hospitals. 1506 Locust St.

1885. Mays, Thomas J., M.D. 1829 Spruce St.

*1868. Mears, J. Ewing, A.M., M.D., LL.D. 1535 Land Title Building, Broad and Sansom Sts.

ELECTED

1911. Meigs, Edward Browning, A.B., M.D., Fellow in Physiology at the Wistar Institute. Wistar Institute, Thirty-sixth St. and Woodland Ave.

1914. Mencke, J. Bernhard, A.B., M.D., Assistant Surgeon to the Out-patient Department of the German Hospital; Assistant Surgeon to the Stetson Hospital. 908 N. Sixteenth Street.

1914. Merrill, Wm. Jackson, M.D., 1927 Chestnut St.

*1894. Miller, D. J. Milton, M.D., Associate Physician to the Children's Hospital. 127 S. Illinois Ave., Atlantic City, New Jersey.

1910. Miller, Morris Booth, M.D., Professor of Surgery in the Philadelphia Polyclinic; Surgeon to the Douglass Memorial Hospital; Assistant Surgeon to the Philadelphia General Hospital. 2117 Pine St.

1881. Mills, Charles K., M.D., Professor of Neurology in University of Pennsylvania; Neurologist to Philadelphia General Hospital; Consulting Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases. 1909 Chestnut Street.

1904. Mitchell, Charles F., M.D., Surgeon to the Germantown, Bryn Mawr, and Chestnut Hill Hospitals, and to the Out-patient Department of the Pennsylvania Hospital. 342 S. Fifteenth St.

†1888. Mitchell, John K., M.D., Attending Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Assistant Neurologist to the Presbyterian Hospital; Attending Physician to the Pennsylvania Training School for Feeble-minded Children. 1730 Spruce St.

1908. Montgomery, Charles M., A.B., M.D., Instructor in the Henry Phipps Institute (University of Pennsylvania); Physician to the Dispensaries of the Pennsylvania and St. Agnes' Hospitals. 2210 Locust St.

1882. Montgomery, Edward E., A.M., M.D., LL.D., Professor of Gynecology in the Jefferson Medical College; Gynecologist to the Jefferson Medical College Hospital and to St. Joseph's Hospital. 1426 Spruce St.

1886. Morris, Caspar, M.D. 2050 Locust St.

1893. Morris, Elliston J., M.D., Physician to the Episcopal Hospital and to the Midnight Mission. 128 S. Eighteenth Street.

ELECTED

1883. Morris, Henry, M.D., Professor of Anatomy in the Woman's Medical College of Pennsylvania; Senior Visiting Physician to St. Joseph's Hospital. 313 S. Sixteenth St.

1856. Morris, J. Cheston, M.D. 1514 Spruce St.

1906. Morrison, William H., M.D. 8021 Frankford Ave.

1897. Morton, Samuel W., M.D. 1933 Chestnut St.

1904. Moulton, Albert R., M.D., Senior Assistant Physician to the Pennsylvania Hospital for the Insane; Physician to the Out-patient Department for Nervous and Mental Diseases at the Pennsylvania Hospital; Professor of Mental Diseases in the Maine Medical School (Bowdoin College). 5431 Locust St.

1905. Müller, George P., M.D., Associate in Surgery in the University of Pennsylvania; Assistant Surgeon to the University Hospital; Professor of Surgery in the Philadelphia Polyclinic; Surgeon to St. Agnes' Hospital; Consulting Surgeon to the Chester County Hospital. 1729 Pine St.

1905. Mutschler, Louis H., M.D., Surgeon to the Episcopal Hospital; Assistant Surgeon to the Orthopædic Hospital. 2030 Tioga St.

1896. Myers, T. D., M.D. 1521 Spruce St.

1902. Nassau, Charles F., M.D., LL.D., Assistant Professor of Surgery in the Jefferson Medical College; Surgeon to St. Joseph's Hospital; Consulting Surgeon to the Frankford Hospital; Assistant Surgeon to the Jefferson Medical College Hospital. 1831 Chestnut St.

1886. Neff, Josefh S., A.M., M.D., LL.D., D.P.H. Narbeth, Pa.

1887. Neilson, Thomas Rundle, A.M., M.D., Surgeon to the Episcopal Hospital and to St. Christopher's Hospital for Children; Professor of Genito-urinary Diseases in the University of Pennsylvania. 1937 Chestnut St.

1905. Newcomet, William S., M.D. 3501 Baring St.

1905. Newlin, Arthur, B.S., M.D., Physician to the Pennsylvania Hospital; Physician to the Dispensary of the Children's Hospital; Assistant Physician to the Orthopædic Hospital. 1804 Pine St.

1899. Nicholson, William Rufus, A.B., M.D., Gynecologist to the Polyclinic and Methodist Episcopal Hospitals; Obstetrician to the Presbyterian Hospital; Associate in Obstetrics in the University of Pennsylvania. 1731 Pine St.

1889. Noble, Charles P., M.D. West Point Pleasant, N. J.

ELECTED

1898. Nolan, Edward J., M.D., Recording Secretary and Librarian of the Academy of Natural Sciences of Philadelphia. 825 N. Twentieth St.

1905. Norris, Charles C., M.D., Instructor in Gynecology in the University of Pennsylvania; Physician to the Maternity Hospital; Consultant Gynecologist and Obstetrician to the Henry Phipps Institute of the University of Pennsylvania; Assistant Gynecologist to the University Hospital. 1503 Locust St.

1905. Norris, George William, A.B., M.D., Assistant Professor of Medicine in the University of Pennsylvania; Physician to the Pennsylvania Hospital; Assistant Physician to the University Hospital. 1530 Locust St.

*1901. Norris, Henry, M.D., Surgeon to the Rutherford Hospital. Rutherfordton, N. C.

*1865. Norris, Isaac, M.D. Fairhill, Bryn Mawr, Pa.

1892. Norris, Richard C., M.D., Lecturer on Clinical and Operative Obstetrics in the University of Pennsylvania; Obstetrician in Charge of the Preston Retreat; Visiting Obstetrician to the Philadelphia General Hospital; Gynecologist to the Methodist Episcopal Hospital, and Consulting Obstetrician and Attending Gynecologist to the Southeastern Dispensary and Hospital. 500 N. Twentieth St.

1913. O'Neal, Alexander H., A.B., A.M., M.D., Physician to the Cathcart and Richardson Homes, Devon; Anesthetizer to the Bryn Mawr Hospital. Wayne, Pa.

*1884. O'Neill, J. Wilks, M.D. Bergenfield, N. J.

*1885. Osler, Sir William, Bart., M.D., Regius Professor of Medicine in Oxford University, England. No. 7, Norham Gardens, Oxford, England.

1903. Ostheimer, Maurice, M.D., Associate in Pediatrics in the University of Pennsylvania; Physician-in-Charge of the Children's Dispensary and Assistant Visiting Pediatric Physician, University Hospital; Physician to the Medical Dispensary of Children's Hospital; Physician to the Austro-Hungarian Consulate, Philadelphia. 2202 De Lancey St.

1913. Outerbridge, George W., A.B., M.D., Assistant Instructor of Surgical Pathology in the University of Pennsylvania; Obstetrician to the Maternity Hospital; Out-patient Surgeon and Pathologist to the Gynecean Hospital. 2040 Chestnut St.

ELECTED

1897. Packard, Francis R., M.D., Surgeon to the Out-patient Department for Diseases of the Ear, Throat, and Nose of the Pennsylvania Hospital; Laryngologist to the Children's Hospital of Philadelphia; Consulting Aurist to the Bryn Mawr Hospital. 304 S. Nineteenth St.

1898. Page, Henry F., M.D., Assistant Physician to the German Hospital and Physician to the Medical Dispensary of the same; Clinical Professor of Medicine in the Woman's Medical College of Pennsylvania. 315 S. Sixteenth St.

1906. Pancoast, Henry K., M.D., Professor of Röntgenology in the University of Pennsylvania and Röntgenologist to the University Hospital. Bala, Pa.

1909. Parish, Benjamin D., B.S., M.D., Assistant Instructor in Otology in the University of Pennsylvania; Assistant Surgeon to the Dispensary for Diseases of the Ear, University Hospital; Aurist and Laryngologist to St. Agnes' Hospital. 29 S. Nineteenth St.

1899. Parke, William E., M.D., Consulting Obstetrician to the Episcopal Hospital; Associate Surgeon to the Kensington Hospital for Women; Gynecologist to the Frankford Hospital. 1739 N. Seventeenth St.

1910. Patterson, Ross Vernet, M.D., Assistant Professor of Medicine in the Jefferson Medical College; Assistant Physician to the Jefferson Hospital. 340 S. Sixteenth St.

1903. Pearce, Richard M., M.D., Professor of Research Medicine in the University of Pennsylvania. 2114 De Lancey Place.

1909. Pemberton, Ralph, M.S., M.D., Visiting Physician to the Presbyterian Hospital; Director of the Department of Clinical Chemistry in the Pathological Laboratory of the Presbyterian Hospital. 2224 Locust St.

†1889. Penrose, Charles Bingham, M.D., Ph.D. (Harvard), Formerly Professor of Gynecology in the University of Pennsylvania. 1720 Spruce St.

1914. Pepper, O. H. Perry, B.S. (Univ. of Penna.), M.D. 1811 Spruce St.

†1902. Pepper, William, M.D., Dean of the School of Medicine, and Assistant Professor of Clinical Pathology in the University of Pennsylvania; Physician to the Philadelphia General Hospital; Assistant Physician to the University Hospital. 1811 Spruce St.

ELECTED

1912. Petty, Orlando H., B.S., A.M., M.D., Instructor in Medicine in the Jefferson Medical College; Pathologist and Assistant Physician to St. Timothy's Hospital; Physician to the Kensington Dispensary for the Treatment of Tuberculosis. 6215 Ridge Ave.

1905. Pfahler, George E., M.D., Director of the Röntgen Ray Laboratory of Medico-Chirurgical Hospital. 1321 Spruce St.

1907. Pfromm, George W., Ph.G., M.D., Assistant Physician to the American Stomach Hospital; Consulting Physician to the German Protestant Home for the Aged. 1431 N. Fifteenth St.

1907. Phillips, Horace, M.D., Second Assistant Physician to the Pennsylvania Hospital for the Insane; Visiting Physician to the Eastern Penitentiary of Pennsylvania. Pennsylvania Hospital for the Insane, Forty-fourth and Market Sts.

1911. Physick, Emlen, M.D. Cape May, N. J.

1883. Piersol, George A., M.D., Sc.D., Professor of Anatomy in the University of Pennsylvania. 4724 Chester Ave.

1911. Piersol, George Morris, B.S., M.D., Associate in Medicine in the University of Pennsylvania; Physician to the Episcopal Hospital; Assistant Physician to the University Hospital; Assistant Physician to the Philadelphia General Hospital. 1913 Spruce St.

1905. Pitfield, Robert L., M.D., Pathologist to the Germantown Hospital; Bacteriologist to the Chestnut Hill Hospital for Lung Diseases. 5211 Wayne Ave.

1896. Posey, William Campbell, M.D., Surgeon to the Wills Eye Hospital; Professor of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine; Ophthalmic Surgeon to the Howard Hospital; Ophthalmologist to the Pennsylvania Hospital for Epileptics. 2049 Chestnut St.

1899. Potts, Charles S., M.D., Professor of Neurology in the Medico-Chirurgical College; Neurologist to the Philadelphia General Hospital; Consultant to the Insane Department of the Philadelphia General Hospital; Consultant to the Hospital for the Insane, Atlantic County, New Jersey. 2018 Chestnut St.

1907. Price, George E., M.D., Associate Professor of Nervous and Mental Diseases in the Jefferson Medical College; Neurologist to the Philadelphia General Hospital. 1800 S. Rittenhouse Square.

†1903. Pyle, Walter L., A.M., M.D., Assistant Surgeon to the Wills Eye Hospital. 1931 Chestnut St.

ELECTED

1908. Radcliffe, McCluney, A.M. (Lafayette), M.D., LL.D., Ophthalmic Surgeon to the Presbyterian Hospital; Attending Surgeon to the Wills Eye Hospital. 1906 Chestnut St.

1913. Randall, Alexander, A.M., M.D., Assistant Instructor in Surgery in the University of Pennsylvania; Assistant Surgeon in the Genito-Urinary Dispensary of the University of Pennsylvania. Professional Building, Room 401.

1887. Randall, B. Alexander, M.A., M.D., Professor of Otology in the University of Pennsylvania; Ear Surgeon to the Children's Hospital; Consulting Aurist to the Pennsylvania Institution for the Deaf and Dumb, and to St. Timothy's Hospital. 1717 Locust St.

*1904. Ravenel, Mazyck P., M.D., Professor of Preventive Medicine and Bacteriology and Director of the Public Health Laboratory at the University of Missouri, Columbia, Mo.

1885. Reichert, Edward T., M.D., Professor of Physiology in the University of Pennsylvania. Medical Laboratories, University of Pennsylvania.

1897. Rhein, John H. W., M.D., Professor of Diseases of the Mind and Nervous System in the Philadelphia Polyclinic and College for Graduates in Medicine; Neurologist to the Howard Hospital; Physician to the Philadelphia Home for Incurables; Bacteriologist to the Pennsylvania Training School for Feeble-minded Children. 1732 Pine St.

1906. Rhein, Robert D., M.D., Chief Physician to the Clinic of the American Hospital for Diseases of the Stomach; Physician to the Philadelphia Home for Incurables; Examining Physician to the White Haven Sanatorium. 2016 Pine St.

1891. Rhoads, Edward G., M.D. 159 W. Coulter St., Germantown.

1910. Rhoads, Samuel, M.D., Visiting Physician to the Tuberculosis Department of the Philadelphia General Hospital; Consulting Physician to the Home for Consumptives, Chestnut Hill. 152 Schoolhouse Lane, Germantown.

1898. Riesman, David, M.D., Professor of Clinical Medicine in the University of Pennsylvania; Professor of Clinical Medicine in the Philadelphia Polyclinic; Physician to the Philadelphia General and the Jewish Hospitals. 1715 Spruce St.

1895. Ring, G. Oram, A.M., M.D., Ophthalmic Surgeon to the Episcopal Hospital; Ophthalmologist to the Widener Memorial Home for Crippled Children; Consulting Ophthalmologist to the American Oncologic Hospital. 2014 Chestnut St.

ELECTED

1905. Risley, J. Norman, M.D., Assistant Surgeon to the Wills Eye Hospital; Ophthalmologist to the Pennsylvania Training School for Feeble-minded Children. 2026 Locust Street.

1891. Risley, S. D., A.M., M.D., Ph.D., Attending Surgeon to the Wills Eye Hospital; Professor (Emeritus) of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine; Member of the Board of Managers of the Pennsylvania Training School for Feeble-minded Children; Alumnus Manager of the University Hospital. 2018 Chestnut Street.

†1878. Roberts, John B., M.D., Professor of Surgery in the Philadelphia Polyclinic. 313 S. Seventeenth St.

1899. Roberts, Walter, M.D., Professor of Otology in the Philadelphia Polyclinic; Otologist to the Methodist Episcopal Hospital; Laryngologist to the Philadelphia General Hospital. 1732 Spruce St.

1903. Robertson, William Egbert, M.D., Professor of Theory and Practice of Medicine and of Clinical Medicine in Temple University; Physician to the Episcopal, Samaritan, and Garretson Hospitals. 327 S. Seventeenth St.

1902. Robinson, James Weir, M.D., Assistant Surgeon to the Presbyterian Hospital. 326 S. Sixteenth St.

1903. Robinson, William Duffield, Ph.G., M.D. 2012 Mount Vernon St.

1912. Rodman, John Stewart, M.D., Lecturer on Surgery in the Medico-Chirurgical College; Assistant Surgeon to the Medico-Chirurgical Hospital; Surgeon to the Dispensary of the Presbyterian Hospital; Assistant Surgeon to the Out-patient Department of the Pennsylvania Hospital. 2106 Walnut St.

1900. Rodman, William L., M.D., Professor of Surgery in the Medico-Chirurgical College; Surgeon to the Presbyterian Hospital; Surgeon to the Philadelphia General Hospital. 2106 Walnut St.

1909. Rosenberger, Randle C., M.D., Professor of Hygiene and Bacteriology in the Jefferson Medical College; Professor of Hygiene and Preventive Medicine in the Woman's Medical College of Pennsylvania; Director of the Clinical Laboratory of the Philadelphia General Hospital. 2330 N. Thirteenth St.

ELECTED

1898. Ross, George G., M.D., Assistant Surgeon to the German Hospital and Surgeon to the Out-patient Department of the same; Surgeon to the Germantown Hospital; Surgeon to the Stetson Hospital; Instructor in Surgery in the University of Pennsylvania. 1721 Spruce St.

*1907. Royer, B. Franklin, M.D. Donaldson Bldg., Harrisburg, Pa.

†1905. Rugh, James Torrance, M.D., Associate in Orthopedic Surgery in the Jefferson Medical College; Orthopedic Surgeon to the Methodist and the Philadelphia General Hospitals. 1616 Spruce St.

1897. Sailer, Joseph, Ph.B., M.D., Professor of Clinical Medicine in Universtiy of Pennsylvania; Physician to the Philadelphia, the University, and Presbyterian Hospitals. 1830 Spruce St.

1900. Sajous, Charles E. de M., M.D., B.Lett., LL.D., Knight of the Legion of Honor, and Officer of the Academy of France; Corresponding Member of the Society of Public Medicine of Belgium; Member of Honor of the French Society of Hygiene, etc. 2043 Walnut St.

1905. Sartain, Paul J., M.D. 212 W. Logan Square.

1908. Sautter, Albert C., M.D., Assistant in the Dispensary for Diseases of the Eye in the University Hospital; Assistant in the Eye Dispensary of the German Hospital. 1421 Locust St.

1906. Saylor, Edwin S., M.D. 2005 Chestnut St.

*1910. Scarlet, Rufus B., M.D., Laryngologist to the Home for Consumptives at Chestnut Hill; Assistant in the Department for Diseases of the Ear, Throat, and Nose of the Pennsylvania Hospital; Instructor in Diseases of the Nose and Throat in the Philadelphia Polyclinic and College for Graduates in Medicine. 78 N. Clinton Ave., Trenton, N. J.

1899. Schamberg, Jay F., M.D., Professor of Dermatology and Infectious Eruptive Diseases in the Philadelphia Polyclinic and College for Graduates in Medicine; Assistant Physician to the Municipal Hospital for Infectious Diseases. 1922 Spruce St.

1887. de Schweinitz, George Edmund, A.M., M.D., LL.D., Professor of Ophthalmology in the University of Pennsylvania; Consulting Ophthalmic Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases; The Philadelphia Polyclinic and School for Graduates in Medicine, and the Philadelphia General Hospital; Ophthalmic Surgeon to the University Hospital. 1705 Walnut St.

ELECTED

1913. de Schweinitz, George Lord, B.S., M.D., Assistant Surgeon in the Eye Dispensary of the University Hospital; Ophthalmologist to the Haddock Memorial Home; Ophthalmologist to the Williamson School. 2040 Chestnut St.

1910. Schwenk, Peter N. K., M.A., M.D., Attending Surgeon to the Eye Department of the Pennsylvania Hospital; Attending Surgeon to the Wills Eye Hospital. 1417 N. Broad Street.

1892. Seiss, Ralph W., M.D., Professor of Otology in the Philadelphia Polyclinic; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb. 255 S. Seventeenth St.

1908. Shannon, Charles E. G., A.B., M.D., Instructor in Ophthalmology in the Jefferson Medical College; Assistant in the Ophthalmological Clinic at the Jefferson Medical College Hospital; Ophthalmologist to the Seybert Institution. 1633 Spruce St.

1897. Sharpless, William T., M.D., Physician to the Chester County Hospital. West Chester, Pa.

1906. Shields, William G., M.D., Dermatologist to the Germantown Hospital; Chief of Dermatological Clinic and Assistant Physician to the Jewish Hospital. 414 School Lane, Germantown.

1890. Shoemaker, George Erety, A.M., M.D., Gynecologist to the Presbyterian Hospital and to the Pennsylvania Epileptic Hospital and Colony Farm. 1831 Chestnut St.

*1908. Shoemaker, Harlan, A.B., M.D., Surgeon to Shelby Hospital; Lt. M.R.C., U.S.A. 2005 Congress Ave., Los Angeles, Cal.

†1893. Shoemaker, Harvey, M.D., Visiting Physician to the Sheltering Arms; Consulting Physician to the Southern Home for Destitute Children; Assistant Physician to the German Hospital; Physician to the Out-patient Department of the German Hospital. 2011 Chestnut St.

†1896. Shoemaker, William T., M.D., Associate Clinical Professor of Ophthalmology in the Woman's Medical College of Pennsylvania; Ophthalmic Surgeon to the Germantown Hospital, and Attending Surgeon to the Eye Department of the Pennsylvania Hospital; Assistant Ophthalmologist and Chief of Clinic to the German Hospital; Consulting Ophthalmologist to the Pennsylvania Institution for the Deaf and Dumb, and to the Southern Home for Destitute Children. 109 S. Twentieth St.

ELECTED

1900. Shumway, Edward Adams, B.S., M.D., Ophthalmic Surgeon to the Philadelphia General Hospital; Instructor in Ophthalmology in the University of Pennsylvania, and Assistant Ophthalmic Surgeon to the University Hospital; Assistant Ophthalmologist to the Philadelphia General Hospital; Assistant Ophthalmologist and a Chief of Clinic to the German Hospital. 2007 Chestnut St.

1903. Sinclair, John Falconer, M.D., Physician to the Medical Dispensary of the Presbyterian Hospital; Physician to the Philadelphia Orphan Asylum and to the Presbyterian Orphanage; Physician to the Home of the Merciful Saviour for Crippled Children. 4103 Walnut St.

1907. Sinkler, Francis Wharton, A.B., M.D., Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Physician to the Episcopal Hospital. 1606 Walnut St.

1902. Siter, E. Hollingsworth, M.D., Instructor in Genito-urinary Diseases in the University of Pennsylvania; Genito-urinary Surgeon to the Philadelphia General Hospital; Surgeon-in-Charge of the Genito-urinary Dispensary of the University Hospital; Consulting Genito-Urinary Surgeon to the Eastern Penitentiary, and to the Philadelphia County Prison. 1818 S. Rittenhouse Square.

1904. Skillern, Penn-Gaskell, M.D. 241 S. Thirteenth St.

1904. Smith, Allen J., A.M., M.D., Sc.D. (Penna. Coll.), LL.D. (McGill Univ.), Professor of Pathology and of Comparative Pathology, and Director of Courses in Tropical Medicine in the University of Pennsylvania. Medical Laboratories, University of Pennsylvania.

1905. Smith, S. MacCuen, M.D., Professor of Otology in the Jefferson Medical College; Aurist and Laryngologist to the Germantown Hospital; Aurist to the Jewish Hospital; Consulting Aurist to the Oncologic Hospital. 1429 Spruce St.

1908. Speese, John, M.D., Instructor in Surgery in the University of Pennsylvania; Surgeon to the Dispensary of the Presbyterian, Children's, and Polyclinic Hospitals. 2206 Locust St.

1895. Spellissy, Joseph M., A.M., M.D., Visiting Surgeon to St. Joseph's and to the Methodist Episcopal Hospitals; Assistant Surgeon to the Orthopedic Department of the University Hospital. 110 S. Eighteenth St.

1897. Spiller, William G., M.D., Associate Professor of Neurology and Professor of Neuropathology in the University of Pennsylvania; Clinical Professor of Nervous Diseases in the Woman's Medical College of Pennsylvania. 4409 Pine St.

ELECTED

1894. Stahl, B. Franklin, B.S., Ph.G., M.D., Clinical Professor of Medicine in the Woman's Medical College of Pennsylvania; Associate in Medicine and Lecturer on Dietetics of the Sick in the University of Pennsylvania; Visiting Physician to St. Agnes' and the Philadelphia General Hospitals. 1727 Pine St.

1909. Starbuck, J. Clinton, M.D. 42 E. Washington St., Media, Pa.

1875. Starr, Louis, M.D., LL.D. (Haverford). The Vanderbilt Hotel, 34th St. and Park Ave., New York City.

1912. Stauffer, Nathan Pennypacker, D.D.S., M.D., Laryngologist and Otologist to the Dispensary of the Presbyterian Hospital; to the Pennsylvania Hospital; to the Philadelphia General Hospital, Tubercular Department; to the Home for Crippled Children. 218 S. Twentieth St.

1910. Stellwagen, Thomas C., Jr., M.D., Chief Clinical Assistant in the Out-patient Surgical Department of the Jefferson Medical College Hospital. 110 S. Nineteenth St.

1884. Stelwagon, Henry W., M.D., Ph.D., Professor of Dermatology in the Jefferson Medical College. 1634 Spruce St.

1895. Stengel, Alfred, M.D., Sc.D., Professor of Medicine in the University of Pennsylvania; Physician to the University Hospital and the Pennsylvania Hospital. 1728 Spruce Street.

1901. Stevens, Arthur A., M.D., Professor of Materia Medica, Therapeutics, and Clinical Medicine in the Woman's Medical College of Pennsylvania; Lecturer on Physical Diagnosis in the University of Pennsylvania; Physician to the Episcopal and St. Agnes' Hospitals. 314 S. Sixteenth St.

1902. Stewart, Francis T., M.D., Professor of Clinical Surgery in the Jefferson Medical College; Surgeon to the Germantown Hospital; Surgeon to the Out-patient Department of the Pennsylvania Hospital. 311 S. Twelfth St.

1914. Stewart, Thomas S., B.S. (Univ. of Penna.), M.D. 301 S. Eighteenth St.

1898. Stout, George C., M.D., Professor of Otology in the Philadelphia Polyclinic and College for Graduates in Medicine; Laryngologist and Aurist to the Presbyterian Hospital, the Children's Aid Society, and the William Penn Charter School. 1611 Walnut St.

1884. Stryker, Samuel S., M.D., Physician to the Presbyterian Hospital. 3833 Walnut St.

ELECTED

*1900. Swan, John M., M.D. 457 Park Avenue, Rochester, N. Y.

1898. Sweet, William M., M.D., Clinical Professor of Ophthalmology in the Jefferson Medical College, and Ophthalmic Surgeon to the Jefferson Medical College Hospital; Professor of Diseases of the Eye in the Philadelphia Polyclinic; Attending Surgeon to the Wills Eye Hospital. 1205 Spruce St.

1906. Tait, Thomas W., M.D., Ophthalmologist to the Charity Hospital. 320 S. Fifteenth St.

1900. Talley, James Ely, A.B., M.D., Physician to the Presbyterian Hospital. 218 S. Twentieth St.

1911. Taylor, Alonzo Englebert, M.D., Rush Professor of Physiological Chemistry in the University of Pennsylvania. 4522 Locust St.

1886. Taylor, John Madison, A.B. and A.M. (Princeton), M.D., Adjunct Professor of Non-Pharmaceutical Therapeutics in the Temple University; Editor *Monthly Cyclopedia of Practical Medicine;* Consulting Physician to the Elwyn, Pa., and the Vineland, N. J., Training Schools for Feeble-minded Children. 1504 Pine St.

1887. Taylor, William J., M.D., Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases, and to St. Agnes' Hospital; Consulting Surgeon to the West Philadelphia Hospital for Women. 1825 Pine St.

1886. Taylor, William L., M.D. 1340 N. Twelfth St.

1910. Thomas, Benjamin A., A.M., M.D., Professor of Genito-urinary Surgery in the Philadelphia Polyclinic and College for Graduates in Medicine; Instructor in Surgery in the University of Pennsylvania; Surgeon-in-Chief to the Out-patient Department of the University Hospital. 116 S. Nineteenth St.

1867. Thomas, Charles Hermon, M.D. 3634 Chestnut St.

1912. Thomas, Frank Wister, A.M., M.D., Visiting Physician to "Buttercup Cottage;" Consulting Physician to the Germantown Hospital. 27 E. Mt. Airy Ave.

1907. Thomas, Thomas Turner, M.D., Associate Professor of Applied Anatomy, and Associate in Surgery in the University of Pennsylvania; Surgeon to the Philadelphia General Hospital; Assistant Surgeon to the University Hospital. 2005 Chestnut St.

1897. Thomson, A. G., M.D., Ophthalmic Surgeon to the Pennsylvania Railroad Company. 724 Stock Exchange Bldg.

ELECTED

1896. Thorington, James, A.M., M.D., Professor of Diseases of the Eye in the Philadelphia Polyclinic and College for Graduates in Medicine; Ophthalmic Surgeon to the Presbyterian Hospital; Ophthalmologist to the Ellwyn, Pa., Training School for Feeble-minded Children. 2031 Chestnut Street.

1898. Thornton, Edward Q., M.D., Assistant Professor of Materia Medica in the Jefferson Medical College. 1331 Pine St.

1912. Torrey, Robert G., M.D., Assistant Physician to the Philadelphia General Hospital; Physician to the State Tuberculosis Dispensary. 255 S. Sixteenth St.

1896. Toulmin, Harry, M.D., Medical Director of the Penn Mutual Life Insurance Company. 925 Chestnut St.

1908. Tracy, Stephen E., M.D., Gynecologist to the Stetson Hospital. 1527 Spruce St.

1901. Tucker, Henry, M.D., Genito-urinary Surgeon to the Philadelphia General Hospital; Curator of the Academy of Natural Sciences of Philadelphia. 2000 Pine St.

†1894. Tunis, Joseph Price, M.D., Clinical Assistant to the Nose and Throat Dispensary of the Polyclinic Hospital. St. Martin's, Philadelphia.

1901. Turner, John B., M.D. 1833 Chestnut St.

1866. Tyson, James, M.D., LL.D., Emeritus Professor of Medicine in the University of Pennsylvania and late Physician to the Hospital of the University of Pennsylvania, and to the Pennsylvania Hospital. 1506 Spruce St.

1897. Tyson, T. Mellor, M.D., Physician to the Philadelphia General Hospital; Physician to the Rush Hospital, the Philadelphia Lying-in-Charity Hospital, and the Children's Aid Society of Philadelphia. 1506 Spruce St.

1904. Uhle, Alexander A., M.D., Assistant Instructor in Genito-urinary Diseases in the University of Pennsylvania; Assistant Surgeon to the Dispensary for Genito-urinary Diseases, University Hospital; Assistant Genito-urinary Surgeon to the Philadelphia General Hospital; Assistant Surgeon to the Dispensary of the German Hospital. 1701 Chestnut Street.

1907. Ullom, Josephus Tucker, M.A., M.D., Member of the Staff of the Henry Phipps Institute, Visiting Physician to the Chestnut Hill Hospital. 24 Carpenter St., Germantown.

ELECTED

1913. Vail, William Penn., B.S., M.S., M.D., Laryngologist to the Pennsylvania Institution for the Instruction of the Blind; Laryngologist to the Department for Tuberculosis of the Philadelphia General Hospital; Assistant Laryngologist and Otologist to the Out-patient Department of the Pennsylvania and German Hospitals; Assistant Laryngologist to the Clinic of the Children's Hospital. 1906 Chestnut St.

1873. Van Harlingen, Arthur, Ph.B. (Yale), M.D., Emeritus Professor of Diseases of the Skin in the Philadelphia Polyclinic; Dermatologist to the Children's Hospital. 1831 Chestnut St.

1903. Van Pelt, William Turner, M.D., Ophthalmic Surgeon to the Episcopal Hospital. 1528 Spruce St.

1893. Vansant, Eugene Larue, M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Visiting Physician to the Throat, Nose, and Ear Department of the Howard Hospital. 1929 Chestnut St.

1912. Vaux, Norris Wistar, M.D., Surgeon to the Chestnut Hill Hospital; Surgeon to the Dispensary of the Germantown Hospital. 8901 Germantown Ave., Chestnut Hill.

*1897. Veasey, Clarence A., A.M., M.D. Suite 404, Paulsen Building, Spokane, Wash.

†1883. Vinton, Charles Harrod, A.M., M.D. Hotel New Chatham, Atlantic City, N. J.

1903. Wadsworth, William Scott, M.D. 207 S. Forty-fifth St.

1906. Walker, John K., M.D., Physician to the Children's Hospital of the Mary J. Drexel Home; Physician to the Out-patient Department of the Pennsylvania Hospital. 1915 Rittenhouse St.

1907. Walker, Warren, M.D., Dermatologist to the Episcopal Hospital. 1632 Spruce St.

1904. Walsh, Joseph, A.M., M.D., Visiting Physician to the White Haven Sanatorium and Vice-President of the Board of Directors; Consulting Physician to the Department of Tuberculosis at the Philadelphia General Hospital; Medical Director of St. Agnes' Hospital. 736 Pine St.

1910. Ward, E. Tillson, A.M., M.D. 1415 S. Broad St.

*1893. Warren, Joseph W., M.D., Department of Health. Harrisburg, Pa.

ELECTED

1895. Watson, Arthur W., M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic and College for Graduates in Medicine; Laryngologist to the Jewish Hospital; Laryngologist and Aurist to the Mt. Sinai Hospital; Laryngologist to Home for Incurables. 126 S. Eighteenth Street.

1886. Watson, Edward W., M.D., Physician to the Magdalene Home. 38 S. Nineteenth St.

1903. Weber, Charles H., M.D., Physician to the Dispensary of the Children's Hospital. 2048 Pine St.

1906. Weisenburg, Theodore H., M.D., Professor of Clinical Neurology and of Neuropathology in the Medico-Chirurgical College; Neurologist to the Philadelphia General Hospital; Consulting Neurologist to the State Hospital for the Insane at Norristown, and to the State Hospital for the Feeble-minded and Epileptic at Spring City. 2030 Chestnut Street.

1883. Welch, William M., M.D., Chief Diagnostician to the Bureau of Health, and Consulting Physician to the Municipal Hospital for Contagious Diseases; Consulting Physician to the Northern Dispensary and the Northern Home for Friendless Children. 1411 Jefferson St.

1913. Wells, P. Frailey, A.M., M.D., Ph.D. S. W. Cor. Fortieth and Brown Sts.

1897. Wells, William H., M.D., Assistant Professor of Obstetrics in the Jefferson Medical College; Assistant Obstetrician to the Jefferson Medical College Hospital; Pediatrician to the Willing Day Nursery; Pediatrician to the Charity Hospital. 1135 Spruce St.

1893. Westcott, Thompson S., M.D., Associate in Diseases of Children in the University of Pennsylvania; Visiting Physician to the Methodist Episcopal Hospital; Assistant Physician to the Children's Hospital; Pediatrist to the Jewish Hospital. 1720 Pine St.

1884. Wharton, Henry R., M.D., Surgeon to the Presbyterian and the Children's Hospitals; Surgeon to Girard College; Consulting Surgeon to the Bryn Mawr Hospital, the Chestnut Hill Hospital, St. Christopher's Hospital for Children, the Pennsylvania Institution for the Deaf and Dumb, and the Pennsylvania Institution for the Blind. 1725 Spruce Street.

ELECTED

1901. White, Courtland Y., M.D., Director of the Pathological Laboratories of the Episcopal Hospital; Pathologist to the Children's Hospital and to the Kensington Hospital for Women; Chief Bacteriologist to the Bureau of Health, Department of Health and Charities, Philadelphia. 1808 Diamond St.

1878. White, J. William, M.D., Ph.D., LL.D. (Hon., Aberdeen), John Rhea Barton Emeritus Professor of Surgery in the University of Pennsylvania. 1810 S. Rittenhouse Square.

1905. Whiteway, Harold M., M.D. 1924 Chestnut St.

1898. Whiting, Albert D., M.D., Surgeon to the Germantown Hospital; Assistant Surgeon to the German Hospital; Assistant Surgeon to the University Hospital; Instructor in Surgery in the University of Pennsylvania. 1523 Spruce Street.

1914. Willard, de Forest P., B.S. (Univ. of Penna.), M.D. 1933 Chestnut St.

1907. Williams, Carl, B.S., M.D., Ophthalmic Surgeon to the Germantown Hospital; Instructor in Ophthalmology in the University of Pennsylvania; Ophthalmic Surgeon to the Pennsylvania Institution for the Deaf and Dumb. School Lane and Greene Sts., Germantown.

1912. Willits, Charles H. A.M., M.D., Medical Director of the Provident Life and Trust Company of Philadelphia. Rittenhouse Hotel.

1902. Willson, Robert N., M.D., Pathologist to the Presbyterian Hospital; Physician to the Philadelphia General Hospital. 1827 Spruce St.

1881. Wilson, H. Augustus, M.D., Professor of Orthopedic Surgery in the Jefferson Medical College; Emeritus Professor of Orthopedic Surgery in the Philadelphia Polyclinic; Consulting Orthopedic Surgeon to the Philadelphia Lying-in Charity Hospital and the Kensington Hospital for Women; Orthopedic Surgeon to St. Agnes' Hospital. 1611 Spruce St.

1874. Wilson, James Cornelius, A.M. (Princeton), M.D., Emeritus Professor of the Practice of Medicine and of Clinical Medicine in the Jefferson Medical College; Physician-in-Chief to the German Hospital; Emeritus Physician to the Pennsylvania Hospital; Consulting Physician to the Bryn Mawr Hospital. 1509 Walnut St.

1902. Wilson, Samuel M., M.D. 1517 Arch St.

1897. Wilson, W. Reynolds, M.D. 1709 Spruce St.

ELECTED

1912. Winsor, Henry, M.D., Surgeon to the Dispensary of the Episcopal Hospital; Prosector to the Associate Professor of Applied Anatomy, and Assistant Instructor in Surgery in the University of Pennsylvania. 319 S. Sixteenth St.

1904. Wister, James W., M.D., Physician to the Out-patient Department of the Germantown Hospital. 5430 Germantown Ave.

*1901. Witmer, A. Ferree, M.D. Freeport, Long Island, N. Y.

1893. Wood, Alfred C., M.D., Assistant Professor of Surgery in the University of Pennsylvania; Surgeon to the University, the Philadelphia General, St. Timothy's, and the Howard Hospitals. 2035 Walnut St.

1900. Wood, George B., M.D., Instructor in Laryngology in the University of Pennsylvania; Assistant in the Clinic for Diseases of the Nose and Throat at the Polyclinic Hospital. 129 S. Eighteenth St.

1865. Wood, Horatio C., M.D., LL.D. (Yale and Lafayette), Emeritus Professor of Materia Medica and Therapeutics in the University of Pennsylvania. 4107 Chester Ave.

1903. Wood, Horatio C., Jr., M.D., Professor of Pharmacology and Therapeutics in the Medico-Chirurgical College. 1905 Chestnut St.

1880. Woodbury, Frank, M.D., Secretary to the Committee on Lunacy of the Board of Charities of Pennsylvania. 218 S. Sixteenth St.

*1911. Woods, Andrew H., A.B., M.D., Neurologist to the Canton Hospital and to the Canton Hospital for Women; Acting President and Medical Superintendent of the Canton Christian College. Canton Christian College, Canton, China.

1901. Woods, Richard F., M.D., Assistant Surgeon to the Gynecean Hospital. 1501 Spruce St.

†1897. Woodward, George, M.D. W. Willow Grove Ave., Chestnut Hill, Philadelphia.

1913. Woodward, W. Wellington, M.D. 26 S. Church St., West Chester, Pa.

1903. Worden, Charles B., M.D., Associate in Diseases of the Stomach and Intestines in the Philadelphia Polyclinic; Physician to the Dispensary of the Presbyterian Hospital; Anesthetizer to the Orthopedic Department of the University Hospital; Physician to the Presbyterian Orphanage. 322 S. Sixteenth St.

ELECTED

1889. Young, James K., M.D., Professor of Orthopedic Surgery in the Philadelphia Polyclinic; Clinical Professor of Orthopedic Surgery in the Woman's Medical College of Pennsylvania; Associate Professor of Orthopedic Surgery in the University of Pennsylvania. 222 S. Sixteenth St.

1894. Zentmayer, William, M.D., Professor of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine; Attending Surgeon to the Wills Eye Hospital; Ophthalmologist to the Glen Mills School. 1819 Spruce St.

1899. Ziegler, S. Lewis, A.M., M.D., Sc.D., Attending Surgeon to the Wills Eye Hospital; Ophthalmic Surgeon to St. Joseph's Hospital; Membre Société Française d'Ophtalmologie. 1625 Walnut St.

1887. Ziegler, Walter M. L., A.M., M.D. 1418 N. Seventeenth St.

1895. Zimmerman, Mason W., M.D., Consulting Ophthalmic Surgeon to the Germantown Hospital. 1522 Locust St.

ASSOCIATE FELLOWS

(Limited to Fifty, of whom Twenty may be Foreigners)

American

ELECTED

1911. Abbe, Robert, M.D. 13 W. Fiftieth St., New York City, N. Y.

1909. Billings, Frank, M.D., 122 S. Michigan Boulevard, Chicago, Illinois.

1886. Cheever, David W., M.D., 557 Boylston Street, Boston, Massachusetts.

1893. Councilman, William T., M.D., Harvard Medical College, Boston, Massachusetts.

1909. Crile, George W., M.D., 1021 Prospect Avenue, S. E., Cleveland, Ohio.

1909. Dana, Charles Loomis, M.D., 53 West Fifty-third Street, New York City, New York.

1892. Emmet, Thomas Addis, M.D., 91 Madison Avenue, New York City, New York.

1903. Gorgas, William C., M.D., U. S. A., Washington, D. C.

1891. Jacobi, A., M.D., 19 East Forty-seventh Street, New York City, New York.

1912. McCaw, Lieut. Col. Walter D., M.D. Care of Surgeon-General's Office, Washington, D. C.

1909. Mall, Franklin P., M.D., 1514 Bolton Street, Baltimore, Maryland.

1906. Mayo, William J., M.D., Rochester, Minnesota.

1906. Pilcher, Lewis Stephen, M.D., 145 Gates Avenue, Brooklyn, New York.

1886. Reeve, John C., M.D., LL.D., S. W. corner Third and Wilkinson Streets, Dayton, Ohio.

1906. Shattuck, Frederick C., M.D., 135 Marlborough Street, Boston, Massachusetts.

1896. Sternberg, George M., M.D., U. S. A., 1019 Sixteenth Street, N. W., Washington, D. C.

ELECTED

1896. Tiffany, L. McLane, M.D., 831 Park Avenue, Baltimore, Maryland.

1894. Warren, J. Collins, M.D., 58 Beacon Street, Boston, Massachusetts.

1894. Weir, Robert F., M.D., 11 East Fifty-fourth Street, New York City, New York.

1892. Welch, William H., M.D., Johns Hopkins Hospital, Baltimore, Maryland.

Foreign

1890. Baccelli, Guido, Rome, Italy.

1908. Bannerman, W. B., M.D., Lt. Col. I. M. S., 11 Strathearn Place, Edinburgh, Scotland.

1894. Brunton, Sir T. Lauder, M.D., 10 Stratford Place, London, W., England.

1903. Finlay, Charles J., M.D., Havana, Cuba.

1899. Fraser, Sir Thomas R., M.D., LL.D., F.R.C.P., F.R.S., 13 Drumsheigh-Gardens, Edinburgh, Scotland.

1903. Horsley, Sir Victor Alexander Haden, F.R.S., 25 Cavendish Square, London, England.

1893. von Jaksch, Rudolf, M.D., Prague, Bohemia.

1903. Kocher, Prof. Theodor, M.D., Laupenstrasse 25, Berne, Switzerland.

1912. Lazarus, Paul, M.D., Hindersinstr. 2, Berlin, N. W., Germany.

1909. Macallum, Archibald B., M.A., M.B., Ph.D., Sc.D., LL.D., F.R.S., 59 St. George Street, Toronto, Canada.

1906. Myles, Sir Thomas, M.D., 33 Merion Square, W., Dublin, Ireland.

1898. Roddick, Thomas G., M.D., 80 Union Avenue, Montreal, Canada.

1908. Ross, Major Ronald, M.D., R.A., Liverpool School of Tropical Medicine, Liverpool, England.

1869. Valcourt, Th. de, M.D., Cannes, France.

1904. Waldeyer, Prof. Wilhelm, M.D., W. 62 Sutherstr. 35, Berlin, Germany.

CORRESPONDING MEMBERS

ELECTED

1880. Carrow, Flemming, M.D., Washington Arcade, Detroit, Michigan.

1885. Rendu, Jean, M.D., Lyons, France.

NECROLOGICAL LIST

FELLOWS

S. WEIR MITCHELL,	January 4, 1914
MORRIS LONGSTRETH,	September 19, 1914
JOSEPH SCRIBNER GIBB,	November 7, 1914
WILLIAM R. BULLOCK,	November 18, 1914
SHERBORNE W. DOUGHERTY,	November 23, 1914
CHARLES H. REED,	November 23, 1914

ASSOCIATE FELLOWS

JOHN HUGHLINGS JACKSON,	October 7, 1911
OLIVER F. WADSWORTH,	November 29, 1911
PHILIP HENRY PYE-SMITH,	May 23, 1914

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MEMOIR OF RICHARD A. CLEEMANN, M.D.[1]

By FREDERICK P. HENRY, M.D.

I did not accede to the request of the President of the College and of the Board of Censors that I should prepare a memoir of Dr. Richard A. Cleemann without a good deal of hesitation. While I appreciated most deeply the honor of the task I had a keen sense of my unfitness to perform it. I felt that it might be better to confide it to someone whose feelings were not deeply enlisted, but when I ran over the roll of those most likely to be entrusted with it I could find no such person. It was evident that, in this respect, they were all at the same disadvantage, if such it really is, as myself. The chief motive, however, which induced me to prepare this memoir was the desire that my name in the future, as in the past, should be intimately associated with that of Richard Cleemann.

In a memoir of the late Professor William S. Forbes which I read before this College on January 2, 1907, I expressed the opinion that it is the duty of every man to bequeath to his family a personal record of the principal events of his life. Such documents, I said, are rare and are more highly prized by their fortunate possessors than any amount of so-called personal or real estate. Dr. Cleemann discharged this important duty shortly before his death. In the *Journal of Commerce*, February 24, 1912, there is a sketch of his life for which I am informed he furnished the data and with which he expressed his satisfaction. Nevertheless it is defective in several important particulars which I

[1] Read January 7, 1914.

have fortunately been able to supply from other sources, and especially from an admirable notice in the *Public Ledger* of November 20, 1912, which was written by one of his fellow students at the University of Pennsylvania of the class of 1859.

Richard Alsop Cleemann was born in Philadelphia on February 22, 1840. He was the son of Gustavus Bernard Christian Cleemann, who was born in Livonia, Russia, March 4, 1789, and died in Philadelphia on October 22, 1855. His paternal grandfather was a Lutheran clergyman whose pastorate was at Pernigel, a town in Livonia. Notwithstanding these facts, Dr. Cleemann disclaimed a Russian ancestry, informing me on one occasion when the subject arose that his father's family was of German origin. His mother was a Miss Claramond Colquhoun, of Petersburg, Virginia, whose surname is "confirmation strong" of Scottish descent. He was the survivor of five brothers and two sisters, only one of whom, a sister, was married, and died childless. The Cleemann family afforded the most remarkable example of so-called "family" disease of which I have personal knowledge. The first-born, Frederick, born in 1825, died at the age of thirty-eight. I have been unable to ascertain the cause of his death. Walter, the second child, born in 1827, died at La Union, San Salvador, of Chagres fever at the age of thirty-seven. Thomas, the youngest of the family, born in 1843, died of yellow fever at Guayaquil, Ecuador, at the age of fifty. Of the remaining five, every one suffered from angina pectoris and died suddenly of cardiac disease.

Dr. Cleemann was graduated from the department of Arts of the University of Pennsylvania in 1859 at the age of nineteen. Several of his classmates are living and with some of them I have held correspondence in connection with the preparation of this memoir; but I have found no one who could give me any information concerning his schoolboy days. I know that he went to a French school where he was thoroughly grounded in the French language. In fact, I have never known anyone not educated abroad who had such a thorough knowledge of French, which he not only spoke but wrote, both fluently and correctly.

His college classmates with whom I have corresponded dilate upon the extraordinary resemblance between Richard and his twin brother Ludovic, and the mystifications to which it gave rise. One of them writes: "They were practically of the same standing, for the reason that they were so alike in stature, size, face, ability, voice, and dress that no professor could tell one from the other in recitations or elsewhere. Hence similarity of marking and an endless source of dazedness and amusement. This was true of their classmates as well as of their teachers. Only a very few intimates, and that after considerable companionship, could tell them apart. In my own case Dick's black-rimmed gold shirt stud was my safest guide for a long while."

The following extract from the letter of another classmate is almost identical with the preceding: "The twin brothers Richard and Ludovic were remarkable, as you no doubt recall, for their close resemblance. It was very difficult to tell them apart even to their most intimate friends. In their entire college course of four years, the professors never distinguished them. They were excellent scholars and their marks were practically identical and they always stood next to each other in the class, one taking precedence in one term and the other in the next." Both of these correspondents comment upon the physical strength of the twins and their proficiency in gymnastic exercises.

In this connection I may relate my own experience in distinguishing or, rather, in confounding the twins. I had known Dr. Cleemann for several years before I was acquainted with his brother. At least I was under that impression until undeceived by the brother in question. One day I found myself just behind him in a row of people lined up before the teller's window of one of the city banks. We entered into conversation at once, in the course of which I asked him something about the progress of an epidemic of diphtheria then prevailing. Finding himself unable to keep up the farce, he said with that peculiar intonation so characteristic of the Doctor: "You are evidently under the impression that you are talking to my brother." I confessed that I was and offered my apologies. "Oh," he replied, "this isn't

the first time you have made the same mistake." I then found that I had had the pleasure of his acquaintance for many years without being aware of it. The likeness between these brothers was certainly extraordinary. Their most intimate friends could scarcely tell them apart. On looking at each other, either might have exclaimed in the words of Dromio of Ephesus to his twin brother of Syracuse: "Methinks you are my glass and not my brother."

Immediately after his graduation in Arts, Dr. Cleemann entered the Medical Department of the University and received the degrees of A.M. and M.D. in 1862. This was undoubtedly one of the busiest years of his life, for it is on record that in 1862 he was elected resident physician of the Episcopal Hospital and was, in the month of August or late in July, also appointed Acting Assistant Surgeon, U. S. A. It is evident, therefore, that his term of service as hospital interne must have been curtailed. Nevertheless, he continued to reside in the hospital, which, for a period of eight months, was virtually a government institution. As is well known to those who are interested in this noble Foundation, the late Israel W. Morris, Esq., has published a brochure entitled, "Steps in the History of the Episcopal Hospital of Philadelphia." To this work Dr. Cleemann contributed an account of his experience in the military department of the hospital which concludes with the following words: "When the whole number of soldiers (705) admitted to the military department, and the duration of their stay (less than eight months) are considered, the event may be held to be not very important in the grand history of the Hospital of the P. E. Church; yet it is an interesting and patriotic episode which perhaps justifies this imperfect mention."

At the close of his military service at the Episcopal Hospital Dr. Cleemann was transferred to the U. S. Army Hospital at Nicetown, Philadelphia, where he continued to serve as Acting Assistant Surgeon until September, 1864.

It is not my purpose to write a biography of Dr. Cleemann and, therefore, I shall merely suggest the nature of his life-work by mentioning the most important of his numerous professional

positions. His medical colleagues will have no difficulty in imagining the quality and amount of his occupations, but it may surprise those who knew him only as the brilliant man of society to be assured that he was one of the busiest men in the medical profession. We often hear of many-sided men, but sometimes the sides, the facets, of these jewels are of trivial dimensions. They occasionally emit sparks of light but their brilliancy is fitful and depends largely upon setting and environment. In considering the character of Dr. Cleemann one is impressed with the conviction that the question whether it was many-sided or not is subordinate to the fact that it had two principal sides, the one professional, the other social, and that they shone, not fitfully through any adventitious stimulus, but steadily through their own inherent lustre.

Dr. Cleemann was elected a Fellow of this College in January, 1872, and filled the office of Secretary from January, 1879, to May, 1885. With the utmost respect for the exalted office of President of this College and for the long line of distinguished men who have occupied it, I have no hesitation in sayng that, from the practical business stand-point, the office of Secretary is the more important of the two. The man who accepts it does so knowing that it is anything but a sinecure. It is true that it carries with it the additional honor of a seat in the Council, but this involves an addition of work for the Secretary of the College is also the Secretary of the Council. There is no subtraction in the problem that confronts the Secretary, but of late there has been a successful attempt at division of his onerous duties. When Dr. Cleemann was Secretary of the College its membership was only half that of the present day, but the duties of the office were the same in kind then as now, and required the same unflagging punctuality and methodical industry.

Other appointments and offices held by Dr. Cleemann in connection with his fellowship in the College were the following:

Delegate to the American Medical Association, 1874; Member of the Committee on Meteorology and Epidemics, 1874–1880; Delegate to the International Medical Congress, 1876; Member

of the Committee on Entertainments, 1884–1893; Councillor by election, 1886–1888; Censor, 1895–1912.

The other medical Societies of which he was a member were: The Pathological Society of Philadelphia, 1866; Obstetrical Society of Philadelphia, 1868; President, 1882–1884; American Medical Association, 1872; Philadelphia County Medical Society, 1876; Medical Society, State of Pennsylvania, 1879; American Climatological Association, and the Philadelphia Pediatric Society.

He was District Physician to the Philadelphia Dispensary, 1865–1868; Physician to St. Mary's Hospital, 1872–1876, and 1878–1879; Physician to the Church Home for Children, 1868–1880; Alumni Manager of the University Hospital, 1880; Member of the Board of Health for eight years, dating from 1878; Director of the Board of Charities and Correction from 1887 to 1892, and Member of the State Quarantine Board of Pennsylvania, of which at the time of his death he was President.

"He was active in the work of the American Philosophical Society and was its Secretary for several years. For over twenty years he was a manager of the Pennsylvania Institution for the Instruction of the Blind, which was full of interest that appealed to him and he was most active and judicious in his suggestions connected with the health and training of the pupils of that school . . . . . He found time to attend to many social duties and on the Boards of the Assembly and of the Charity Balls he was called upon over and over again to assist in managing functions requiring great tact and judgment." He was also a member of the Society of Colonial Wars, of the American Academy of Political and Social Science, and of the Rittenhouse Club.

Dr. Cleemann's contributions to medical literature are, for the most part, contained in the *Transactions of the College of Physicians,* and they all bear the stamp of close observation and conservative deduction. Among them is a Memoir of the late Dr. William Darrach. His best work was never printed. I refer to his triennial Reports as Representative of the College

on the State Quarantine Board, the last of which was read on December 6, 1911.

From the foregoing enumeration of his appointments and offices, medical, political, and social, which I fear is incomplete, the statement that he was one of the busiest men in the medical profession is amply confirmed.

At the memorial meeting to Dr. Wharton Sinkler which was held in this room on March 18, 1910, I remarked that there is nothing more difficult than to fix the date of the beginning of a friendship. "We might as well," I said, "endeavor to recall the circumstances of our own birth as those of the birth of something which has become an integral part of ourselves." We all at times make statements of which we are not fully convinced until we find them confirmed by others or by our own subsequent experience. Those with whom I have conversed upon this subject have experienced the difficulty to which I allude and now again I encounter it. If our friendships were deliberately constructed we would have no difficulty in recalling the time when their corner-stones were laid and the circumstances attending the ceremonies. There is, as a rule, no better index to the true nature of mental processes than that afforded by language. In my opinion the philologist has more resources at his command for the investigation of psychical processes than either the anatomist or the physiologist, I might even say than both combined. Language, however, has its imperfections and I take exception to the verb "make" as applied to friendship. Friendship may begin with indifference or even with antipathy. It is like a tender root in a dry ground and cannot be forced. If one, for politic reasons, wished to keep two people apart, to prevent their intimacy, a good way to do so would be to introduce them to one another with the remark: "I want you two to be good friends." Friendships, in spite of the imprimatur of Goethe, are not "elective." They are the result of that mysterious affinity whose laws, though not so well understood, are as certain in their operation as the laws of chemistry and physics.

The pathways of the earlier period of the lives of Dr. Cleemann

and myself were certainly not convergent. While he was a student at the University of Pennsylvania I was a schoolboy in France. While he was Acting Assistant Surgeon, U. S. A., I was a student at the College of New Jersey, now known as Princeton University. When I came to Philadelphia in 1869, after graduating the year before in medicine at the College of Physicians and Surgeons, New York, he was well established in practice. My first distinct recollection of meeting him was in the late seventies at the bedside of a patient. The case was a surgical one, the operator was Dr. de Nancrede and Cleemann and I were the assistants. At the close of the operation it became necessary to move the patient—a full-grown woman—from the table to the bed, and I stepped forward to perform the feat. Before I could lay hands on her Cleemann waved me aside with the remark that he would do it because—*horresco referens*—he was stronger than I. On looking back I have no doubt that he was right, but at the time I was strongly inclined to argue the point. That is not the way in which friendships usually begin. We saw a good deal of each other during the meeting of the American Medical Association, in New York, in 1880, and I suppose our friendship may be said to date from about that period. At least there were incidents connected with that visit to which we both often referred for many years after their occurrence.

However interesting it might be to me to enter into further details concerning our relations, professional and social, it would, I fear, be wearisome to my audience. I shall, therefore, devote the remainder of this sketch to a consideration, which must be superficial, of the character and personality of the man.

Although Dr. Cleemann had passed the so-called allotted span of life, he was in no other sense of the word an old man. Age could not wither him. His eye was not dim nor his natural strength abated. He took a vivid interest in all contemporary events and his society was eagerly sought and welcomed by old and young. He was a most entertaining talker and never interrupted anyone except himself. He knew when to stop. If, as is sometimes said, conversation is becoming a lost art, it is not the fault of conversa-

tion, but of the would-be artists who interrupt everyone except themselves. Although his appearance was eminently handsome and dignified and noble, the adjective "venerable," as employed to-day, is about the last that anyone would have thought of applying to him. It is impossible to analyze the charm of certain individuals whom all agree in describing as charming. It is the beautiful and simple result of complex processes and is as inexplicable to the psychologist as is the perfume of the flower to the chemist. Nevertheless, it is often a simple matter to detect the predominating trait of a charming personality, and it seems to me that the dominant theme in the symphony of Cleemann's character was cheerfulness. He was a congenital optimist and his optimism increased as he advanced in years. He saw beauty in the plainest-featured women and good in the veriest reprobate. From the stand-point of the cynic his analysis of character was woefully defective, but even the cynic could not fail to admire it nor refuse to acknowledge that, now and then, it resulted in the discovery, so to speak, of a particle of radium in tons of refuse.

Another element which contributed to the charm of Dr. Cleemann's character was simplicity, naturalness. To be completely natural is to be like our first parents, naked and not ashamed. I use the word naked in its application to the thoughts and intents of the heart and their expression rather than to the physical organism. It is impossible, in what is called cultivated society, to be invariably natural, but it seems to me better to be occasionally naked, *i. e.*, natural, and ashamed of it than to be continually clothed in convention and supremely self-satisfied. Cleemann was more continuously natural than any man I have ever known. He presented the unusual combination of an accomplished man of the world, to whom the air of society was as the breath of his nostrils, with the simplicity of a child—the wisdom of the serpent with the harmlessness of the dove.

I have made no claim that Dr. Cleemann was a great man. What I have said of him will, I am convinced, be confirmed by all who knew him. I am simply acting as their mouthpiece. He was the high-bred gentleman, not the Napoleonic boor who rides

rough-shod over the rights and feelings of others. Nevertheless, he possessed qualities which the greatest man might admire and envy and for which he might be willing to exchange a large portion of his fame. There are those whom all men like and few men trust; there are those whom all men trust and few men like, and there are others, few in number, but sufficient to constitute the saving remnant of humanity, whom all men both love and trust. To the last-mentioned class belonged Richard Cleemann. Their names may not be inscribed in any Hall of Fame but neither are they "writ in water"—"not on tables of stone, but in the fleshy tables of the heart."

My last interview with Dr. Cleemann was just a week before his death. We had gone to a so-called place of amusement, and, afterward, had sat late, conversing on various subjects, one of which was a trip to Europe during the following summer. He asked me if I would go with him and I promised that I would, but did so with averted head lest he should read in my expression the thought, the conviction, that the pledge would never be redeemed.

For two or three years before his death, Dr. Cleemann had suffered from attacks of dyspnea and precordial oppression on moderate exertion. I was in the habit of walking home with him after the meetings of the College and Council and I noticed with apprehension his steadily increasing disability. He would be compelled to pause during the short walk and, on reaching his house, would drop into a chair unable to speak for several minutes. He spoke of these attacks in his usual airy manner and told me of one of unusual severity which he had experienced in Warsaw the preceding summer. He said with a smile, as if the circumstance was rather amusing than otherwise, that he thought he would have died in the street. On November 19, 1912, after attending the annual meeting of the Council of the Society of Colonial Wars, he was seized between 1 and 2 A.M. with the fatal paroxysm. He summoned his servants, calmly informed them that it was his last attack, and sent for his physician, Dr. George W. Norris. He was dead when Dr. Norris arrived.

I know very little, if anything, concerning Dr. Cleemann's views on the subject of religion. It is sufficient for me to know of any man, whatever his nominal creed may be, that "out of the good treasure of his heart he bringeth forth good things." In this connection I am reminded of an exquisite poem of Lamartine, the melody of which is lost in translation, wherein the poet compares the heart of him whom he addresses to a golden urn, in which the smallest tribute dropped resounds as though it were a great treasure.[1]

I was familiar with this poem long before I knew Dr. Cleemann, but when I read it now I think of him as of one to whom it might have been dedicated.

At the beginning of this sketch I stated that my principal motive in writing it was the desire that my name, in the future. as in the past, should be associated with that of Richard Cleemann. Such a feeling is shared by every man who has had, and lost by death, a valued friend. The most beautiful expression of this sentiment with which I am acquainted in literature, either ancient or modern, is to be found in the auto-epitaph of Sir Foulke Greville, afterward Lord Brooke, a statesman, courtier, and poet of the time of Queen Elizabeth. It is an indirect expression of the feelings of the writer and a fitting conclusion of this fragmentary Memoir:

"Servant to Queen Elizabeth,
Counsellor to King James,
And friend to Sir Philip Sidney."

[1] "Ton coeur sonore de poëte
Est semblable à ces urnes d'or
Où la moindre aumône qu'on jette
Résonne comme un grand trésor."

MEMOIR OF THOMAS G. MORTON, M.D., AND PRESENTATION OF PORTRAIT[1]

By MORRIS J. LEWIS, M.D.

Mr. President and Fellows of the College of Physicians:

It is my agreeable duty to present to the College tonight, in the name of Mr. Arthur V. Morton, of this city, a portrait of his father, the late Dr. Thomas G. Morton, a Fellow of this College from the year 1861 to the time of his death, May 20, 1903, and to read this short memoir.

Dr. Morton, the son of the late Dr. Samuel G. Morton, himself a distinguished physician and a Fellow of this College, was born in Philadelphia, August 8, 1835. As a boy Dr. Morton showed great ability and energy of purpose, and these characteristics were ever present with him until the day of his death.

Dr. Morton was graduated from the Medical Department of the University of Pennsylvania in 1856 where his aptitude for study won the respect and interest of his instructors.

During the succeeding three years he held the position of Resident Physician in the St. Joseph's, Wills' Eye, and Pennsylvania Hospitals, ending his service as Resident in the latter institution in the year 1858. In 1860 he was elected Pathological Curator of the Pennsylvania Hospital and served in this capacity for four years.

The War Department at Washington has records showing that Dr. Morton served his country during the Civil War as

[1] Read February 4, 1914.

Acting Assistant Surgeon, almost continuously from May 1862 to February 1865 in the General Hospitals in Philadelphia which were established for the care of the sick and wounded soldiers. He served in this capacity in the General Hospital at Fifth and Buttonwood, which was under the charge of Acting Assistant Surgeon C. Bournonville, for the five months ending October 10, 1862, at which time he was assigned to take charge of the General Hospital at Twelfth and Buttonwood, where he served five months, until its close, March 31, 1863. He also served at the Satterlee General Hospital in West Philadelphia from July 1863 to January 1864, and at the Mower General Hospital, Chestnut Hill, from June 1864 to February 1865.

Dr. Morton held many other surgical positions of great responsibility and trust at different times, showing the confidence placed in him by the community at large.

Among such positions may be mentioned the following: Surgeon to the Pennsylvania Hospital; Surgeon to the Wills' Eye Hospital; Surgeon to the Philadelphia Orthopædic Hospital and Infirmary for Nervous Diseases; Consulting Surgeon to the Pennsylvania Institute for the Instruction of the Blind; Surgeon to the Jewish Hospital; Consulting Surgeon to the Pennsylvania Institute for the Deaf and Dumb; Member of the Advisory Board of the Woman's Hospital; Surgeon to the Howard Hospital; Professor of Orthopædic Surgery to the Philadelphia Polyclinic and College for Graduates in Medicine, of which Institution he was also one of the original Trustees; Member of the Commission of Public Charities of Pennsylvania and chairman of its Commission on Lunacy; Consulting Surgeon of the Asylum for the Chronic Insane at Wernersville; Consulting Surgeon of the Pennsylvania Epileptic Hospital and Colony Farm; President of the American Society for the Restriction of Vivisection; Vice-president of the Pennsylvania Society for the Prevention of Cruelty to Children; Fellow and President of the American Academy of Surgery; Member of the Commission to Locate and Build the Asylum at Norristown. In addition to these positions he was a member of many of the surgical, scientific, and social

societies both here and abroad. A list of positions which surely is an evidence of his untiring energy.

The two institutions which called forth most of his enthusiasm were the Philadelphia Orthopædic Hospital and Infirmary for Nervous Diseases and the Pennsylvania Hospital. He was the founder of the Philadelphia Orthopædic Hospital in 1867, and in the fall of 1870, at his instigation, the hospital still further increased its scope and usefulness by creating a department for nervous diseases, and the late Dr. S. Weir Mitchell was elected physician to the same.

In 1872 the name of the Hospital was changed to its present title, "The Philadelphia Orthopædic Hospital and Infirmary for Nervous Diseases."

Dr. Morton served continuously here until his resignation to become Consultant, a few years before his death. But the Pennsylvania Hospital was his particular favorite, to which institution he was elected Surgeon in 1864, at the early age of twenty-nine years, immediately after his resignation as Pathological Curator. He served here continuously until the day of his death in 1903, a period of thirty-nine years, a term of service only exceeded by Dr. Thomas Parke, with forty-six years to his credit. If his terms of service as Resident and Curator be added to his term of service as Surgeon, it will be seen that he was connected with the Hospital for over forty-three years.

It was here that the writer made the acquaintance of the subject of this memoir, first as Resident in 1874, and later as his colleague, here and also in the Philadelphia Orthopædic Hospital and Infirmary for Nervous Diseases, so that ample opportunity was vouchsafed him to study his skill as a surgeon and his untiring energy in the pursuit of his calling. Many of the Fellows of the College can recall him as their Chief in the wards of the venerable Pennsylvania Hospital.

Dr. Morton has written much for the Medical Journals upon the subject of appendicitis, particularly during the earlier days of appendicectomy, and has thus aided in the elucidation of the subject.

In the *American Journal of the Medical Sciences* for January, 1875, Dr. Morton published an account of "A Painful Affection of the Foot, Involving Particularly the Fourth Metatarso-phalangeal Articulation," which affection since then has been widely known as the "Morton Toe" or "Morton's neuralgia," and devised an operation for its cure.

Many other writings from his pen have appeared from time to time in the medical journals, and in 1880, in connection with Dr. William Hunt, he published *Surgery in the Pennsylvania Hospital,* a work requiring much painstaking research and compilation, and being a valuable addition to surgical history. In 1893 the managers of the Pennsylvania Hospital authorized the publication of *The History of the Pennsylvania Hospital,* by Dr. Thomas G. Morton, assisted by Dr. Frank Woodbury. This work was published in 1895, and is a book most creditable to its author.

Many mechanical devices for the diagnosis and treatment of surgical disorders are to be accredited to the genius of Dr. Morton.

As President of the Medical Staff of the Pennsylvania Hospital he held the confidence of the managers, and many of the improvements at Eighth and Spruce were undertaken and completed under his advice and guidance.

In his habits he was very social, and found needed relaxation from strenuous work in music and travel. He was also fond of horseback riding, sailing, fishing, and hunting.

Dr. Morton was a member of the Protestant Episcopal Church, and for some years was Vestryman of the Church of the Epiphany. On November 12, 1861, he married Ann Jenks Kirkbride, daughter of the late Dr. Thomas Story Kirkbride, who was for many years the well-known alienist of the Pennsylvania Hospital for the Insane. Mrs. Morton died March 30, 1907. Five children survive them.

It would, perhaps, have been better had a surgeon been chosen to frame this memoir, as he would have been in all probability more intimately associated with Dr. Morton in hospital and private practice, and could have more accurately described the surgical side of this able and energetic man.

The writer, however, had been associated with him for nearly thirty years, and possibly his efforts have not been in vain.

The last sentence of the eulogy passed by the Managers of the Pennsylvania Hospital on the death of Dr. Morton may fittingly end this memoir and applies as well to all with whom he came in contact. It is as follows:

"We commend to all connected with the administration of this Hospital the beautiful example of a well spent life in intelligent devotion to the interests of humanity, which Dr. Morton has left us."

MEMOIR OF GEORGE McCLELLAN, M.D.[1]

"EVERY MOMENT DIES A MAN"

By J. CHALMERS DaCOSTA, M.D., LL.D.

The Angel of Death is ever gleaning his harvest. Rich and poor, young and old, happy and wretched, celebrated and obscure, are alike helpless to check the stern ordinance of fate. Death is the law. The grave hungers for all of us. The doorway of the road to Eternity is ever open. Through it passes an endless procession. Through it shall pass all the sons of men. The young love life.

> "Youth asks itself, How can I ever die?
> Truly the old into the grave must fall,
> While age is wondering with a gentle sigh,
> If all this wasted breath was life at all."

The young are seldom oppressed by the thought of death. This, too, is the law. Were it otherwise the work of the world would not and could not be performed, progress would cease and existence would stagnate. As the years pass age lays his chilling hand upon us. The sunlit hours seem to dance more quickly by. Year by year darkness more quickly follows dawn—winter follows summer—the river flows toward the mysterious unknown. Ever oftener death invades the immediate human circle of each of our lives. One must of necessity be resigned. It is not our right to be sorry for a dead man. We don't know enough to dare to be. The dead are beyond the reach of envy and malice, of misery and unhappiness, of the bitter word of hate, of the serpent's hiss of scorn. Upon the phantom haunted shore of Death the sea of Sorrow casts no wave.

One who still lives has to apprehend the manner of death

[1] Read March 4, 1914.

Destiny has plotted out for him. It was Solon who said—"Count no man happy till you know the manner of his death." Each one of us has ahead of him the grim tragedy of earthly extinction and to some of us it will assuredly come in its most dreadful form. So why should we pity the dead? We say, with Chrysostom: "Honor the dead with remembrance but not with tears." To live always would be an indescribably horrible thing. The gloomy legend of the wandering Jew portrays the hopeless horror of an endless life.

When a dear friend dies we are frightened at the inexorable action of a natural law—we are appalled at our loss—we tell each other of the dead man's life, his sayings, his deeds, his character—we grieve for his lonely family—and we seek to comfort ourselves by the reflection that though he is gone he has but gone before us into the unknown.

Tonight we meet to honor the dead with affectionate remembrance. We gather to pay tribute to the memory of a distinguished scientist, of a dear friend, of a valuable and valued fellow of this college. March 29, 1913, George McClellan was gathered to the bosom of Infinity.

I shall occupy but a brief time telling of his work. I shall make no attempt to relate at length the story of his busy, useful, and successful life. A mere epitome of a man's work tells little of the man. Such a story does not breathe. It is, at best, a mere skeleton, not a flesh clad, blood warm, soul stirred form.

I purpose to try and sketch the man, to draw the outline of his nature, to set forth his characteristics, to portray his character, to put him before you as he was, as the man I know him to have been. This large task has been entrusted to weak and bungling but to tender and sympathetic hands. I loved George McClellan and had reason to, for twice in my life, when I most needed friends, he stood by my side my loyal friend. His taking off has left a gap in my human circle and an emptiness in my life which can never be completely filled.

He came from a long line of distinguished forebears. The blood of fighting Scotchmen and of revolutionary patriots ran

hot in his veins. The ancient home of his race was Kirkcudbright on Solway Firth. The Firth is an arm of the Irish Sea which separates southwestern Scotland from the English county of Cumberland. Kirkcudbright has Dumfries to the East, Ayr to the North, Wigtown to the West. The entire region is a land of song and story and tradition. Into the Firth Paul Jones used to come in the Ranger to escape from his English pursuers, Paul Jones who had been born in Kirkcudbright.

In Kirkcudbright, William Douglas wrote "Annie Laurie." The world sings "Maxwellton's braes are bonnie," and Maxwelltown is just across the county border in Dumfries. It was in Dumfries that Robert Bruce slew Red Comyn, the nephew of Baliol. It was in Dumfries that Robbie Burns was an officer of excise and it was in that town he died. Gretna Green is near by, Gretna Green, where for so many years the village blacksmith married runaway couples from nearby England, a custom which only ended in 1856. Adjacent is Eccleechan (the Entophfuhl of Sartor Resartus) where the great Carlyle was born and where his body rests. Not far away is the hill where Meg Merrilies, she of whom we read in *Guy Mannering*, cursed the Lord of Ellengowan. On every hand are relics and traditions of Bruce and Wallace, of the border wars, of the Black Douglas, of the Jacobites of 1715, of the gay and gallant Prince Charlie and "the 45."

The McClellans were loyal followers of the house of Stuart, and fought for "the pretender" in 1715. After the annihilation of the rebellion many chieftains escaped the tower and the block by fleeing to France or America. The head of the McClellans came to America and settled in Worcester, Massachusetts. He was the grandfather of the grandfather of George McClellan. His son, George McClellan's great-grandfather, held the king's commission in the French and Indian War and was a brigadier-general in the war of the American Revolution. He lived in Woodstock, Connecticut. Three great elms which recently stood and may still stand in that town, were planted by the wife of the revolutionary soldier because he, then a captain, had come safe out of the battle of Bunker Hill.

George McClellan, the son of Washington's brigadier, the grandfather of the McClellan of whom we speak, was born in Woodstock, educated at Yale, studied medicine in the University of Pennsylvania, settled in Philadelphia, married a Philadelphia belle, Elizabeth Brinton, resided here all his days, died here and is buried in Laurel Hill. He was a celebrated surgeon of great originality, intrepidity, dexterity, energy, independence of spirit and force of character. He founded the Jefferson Medical College. Samuel, a brother of the distinguished surgeon, was also eminent as a medical man. He was for a time Professor of Anatomy in Jefferson.

John Hill Brinton McClellan was the father of him we honor tonight. He was Professor of Anatomy in the Pennsylvania Medical College, an institution founded by the elder McClellan after he broke with Jefferson, one which became very successful but perished during the Civil War.

John H. B. McClellan was surgeon to St. Joseph's Hospital and surgeon of Will's Eye Hospital.

John H. B. McClellan's brother, George B., became an illustrious soldier, commanded the army of the Potomac, fought titanic combats, obtained the enthusiastic attachment and complete confidence of great armies, suffered, *many think*, from injustice and unfairness, stood upon the flaming brow of Malvern Hill and rode between the lines at Antietam.

I have set forth the McClellan ancestry because George valued it and was proud of it. And naturally. It is pleasant to know that one's father was a gallant gentleman. Why should it not be pleasant to know that one's grandfather and great-grandfather were the same sort.

I believe that hereditary tendencies, ingrained in the race, constituted the bed-rock basis and the fibre of George McClellan's character. From heredity man gets the leaven of certain tendencies which have profound influence in shaping his destiny. Ancestral characteristics, perhaps somewhat changed, are produced again and again in a line of descent. On the stream of heredity come abilities, passions, weaknesses, capacities, strengths, and immortal

longings. Hereditary tendency does so much to determine our lives it is small wonder that myriads have believed and multitudes do believe in predestination.

When we view George McClellan's fore-elders we find influences that came to build and strengthen his courage, industry, integrity, loyalty, truthfulness, love of freedom, hatred of injustice, manly independence, outspoken honesty, readiness for a fair fight, amazement at treachery, inability to understand the trickster, the time server and the liar.

He had many fine qualities and so had his ancestors before him. They were true gentlemen and so was he.

He was born in Philadelphia, October 29, 1849 of the union of John H. B. McClellan with Maria Eldredge. He was the eldest son and was given the name of his distinguished grandfather. He went to school under Dr. Short and passed three years in the Art Department of the University of Pennsylvania, leaving there in 1868 to study medicine in Jefferson College. During his student days he listened to the Elder Gross, Joseph Pancoast, John B. Biddle, James Aitken Meigs, Benjamin H. Rand, Samuel H. Dickson and Ellerslie Wallace. He was enthusiastically interested in surgery and anatomy and had the privilege of studying those branches under the two greatest surgeons and the greatest surgical anatomist of the country. He graduated in medicine in 1870, and at once began practice, devoting himself particularly to surgery and studying anatomy with unflagging zeal. In 1872 he went to Europe and studied under that master anatomist Professor Hyrtl of Vienna. Hyrtl was by birth a Hungarian. He was professor first in Prague and then in Vienna. He was not only a famous human anatomist but was one of the first comparative anatomists of his day. He was celebrated for the beauty of his anatomical specimens (some of which are in our museum), was a noted author and amost impressive and original teacher. The teaching of the great anatomist captivated the young surgeon, caused him to take up anatomical teaching as a career, and lead him to follow Hyrtl's methods through all his teaching days. In the way he thought of anatomy, in the way

he studied it, in the way he taught it he was essentially a follower of the great Hyrtl.

In 1873 McClellan returned to Philadelphia, established himself in practice, and taught private students anatomy and surgery. In that year he married Miss Harriet Hare, the grand-daughter of the celebrated Professor of Chemistry in the University of Pennsylvania. In 1875 he became a Fellow of this College. We all know what a useful Fellow he was. The Mütter Museum speaks of his interest and industry. In 1880 he became surgeon to the Philadelphia Hospital where he served for ten years. During this period and for a number of years later he was surgeon to the Howard Hospital. In 1881 he founded the Pennsylvania School of Anatomy and Surgery where he taught until 1893. It was a very successful institution. The fame of his teaching drew great numbers of students, especially from Jefferson College. It was in his school of Anatomy I first had the privilege of meeting him and hearing him.

The school was a small building on Medical Street. Its site is now covered by Jefferson College. It was an axiom when I was a student that if you would really like and understand anatomy you must go to McClellan's demonstrations. I was charmed with his teaching. His perfect familiarity with his subject, the beauty of his dissections, the clearness of his demonstrations, the pictures which he drew on the board with such marvelous speed, accuracy and dexterity excited the warmest admiration of his class. His anatomy was art. He dissected a body as a great sculptor would carve a statue. He taught surface relations as well as regional anatomy and discussed the medical and surgical bearings of every triangle, structure, and neighborhood. All the tissues of the body were as familiar to him as the objects which were on his road from Spruce Street to the Jefferson College. I thought then and I think now that nobody ever gave more useful anatomical lectures. In 1890 he was elected Professor of Artistic Anatomy in the Academy of Fine Arts and there he taught for many years with great success.

In 1906 he came to his Alma Mater as Professor of Applied

Anatomy (where many thought he should have been long before). There he taught with distinguished success to the time of his death. His chief literary work is the "Regional Anatomy." It was published in 1891, went through four editions in the U. S., was translated into French and went through two French editions. It is a wonderful and beautiful book. The numerous pictures are real works of art. They were made from photographs of dissections. He made the dissections, took the photographs and colored the pictures. They are absolutely accurate. They show real anatomy—anatomy as it is, not as it ought to be, or as we might wish it to be, or as we may make it seem to be through carelessness or lack of knowledge. Another highly important work is his "Anatomy in Relation to Art." It is a splendid production.

An address which attracted attention and which many of us heard was called "The Cerebral Mechanism of Emotional Expression."

So much for the man's work. What of the man himself?

A prominent element in his nature was sensitiveness. He was keenly affected by external impressions and his spirits responded to them like the sensitive flame to a sound. Sensitiveness may create much happiness and may build many sorrows. It was sensitiveness which gave him his fine artistic impressions. It was sensitiveness that made him suffer acute mental pain when angry words were said, when antagonistic things were done. He could not understand the unfrank attitude, the disregard of a promise made or implied, the language used to conceal thought. He looked upon such things as he did the cloaked form, the masked face, and the deadly stab in the dark. An attitude of personal opposition on the part of one he loved and trusted hurt him to the depths of his nature. In such a situation his looks seemed to say: "Had it been mine enemy who had done this thing then might I have borne it, but it was even thou, mine own familiar friend." Opposition is inevitable in the life of every man and it acts differently on different men. Some it nerves to effort. Some it perverts and damages. Some it utterly destroys. In some it

breeds anger and resentment. It causes some to scoff and jibe with cynic bitterness. To most it brings at least a disenchantment with life, the attitude which is common in those of middle age or beyond. The iron of it entered into McClellan's soul and he felt a sad sense of disappointment. He was conscious of great ability, fine training, and peculiar fitness for distinguished place. He had seen lesser men pass him in the race. He was obliged to wait for weary years before he received suitable recognition. He always felt with a tinge of bitterness that the delay had wasted something of his life by keeping him so long from the proper field for the exercise of his highest abilities.

He was no hypocrite. He was prone to say what he thought. He always believed what he said. He told fearlessly what he held as a truth. He might be mistaken but was never false. Telling the truth often requires resolution and courage but is seldom popular. In asserting profound conviction he was not always tactful. This is a statement and not a criticism for tact, after all, is either a social anesthetic or a lie with a college education. He would not meekly acquiesce in the popular or profitable error. He did not pretend to love those whom be believed had wronged him. He never turned the other cheek. He followed clearer lights and walked in sterner paths. If he distrusted or disliked a man he practiced the hand of Douglas in his own theory:

> "My castles are my King's alone,
> From turret to foundation-stone—
> The hand of Douglas is his own
> And never shall in friendly grasp
> The hand of such as Marmion clasp."

He would have been a poor diplomatist according to Sir Henry Wotton's definition of an ambassador, viz.: "A man sent abroad to lie for his country."

He was a man destined for the minority. He preferred combat to cowardly silence. He had a good, honest temper and in controversy he was positive and uncompromising. No man had a more tender heart. No man was more quick to forgive, if forgiveness was asked. He forgave the unfortunate without being asked and extended his help and pity. He hated guilt but did

not always hate the guilty. He loved animals and understood them. Birds, horses, dogs commanded his affection. He never tried for popularity. He never sought to reach lucrative celebrity by shedding ink and language, by posing, by tricks, by beating the big drum to attract the attention of the crowd. He never in his life played to the gallery. He was a modest gentleman of the old school, a school now so very old as to be neglected and all but forgotten. He believed in its formal courtesies, grave dignity, spotless cleanliness, cherished obligations, chivalrous loyalty, ample hospitality, high integrity, gentle voices, culture, refinement, conventions and traditions.

Comparatively few knew him really intimately. It was only to the chosen ones of his heart that he opened his entire nature.

He was a dignified man. He liked and fitted refined and intellectual society. The baldly unconventional jarred him. It shocked him because of its savor of vulgarity. The really vulgar he utterly repudiated. We cannot picture him supping in a café with Cassanova, or roystering in a tavern with Villon. He would have had none of the friendship of Rochester and would have hated the habits and principles of Tom Paine. He would have admired the intellect of Johnson but would not have been anxious to dine with him. In the Middlesex election he might have voted against Luttrell but would not have been the friend of Wilkes. When he passed his word he kept it loyally. He was loyal in all things—loyal to his profession, loyal to his friendships. He had the loyalty of that Scottish race from which he sprang, the race that would not betray Charles Edward, though it was death to hide him and though there was a fortune ready for any man or woman who would give him up to the English. He fought hard battles for his assistants, taking and giving blows. When he held a man his friend he loved him, trusted him, believed in him and stood by him through thick and thin. When he said he was for you he was. You did not have to send, from time to time, an investigating committee to take the temperature of his advocacy. He made no one a friend because he was rich. He refused no man friendship because he was poor.

He was by birth, instinct and training the truest of gentlemen. The very nature of a gentleman looked out from his kindly face, showed in his genial greeting, sounded in his refined voice, was manifest in his cordial and polished hospitality. He showed at his best as a host in his own house. In that house he entertained his friends. He would not do it in a club or hotel. He was gentle to his family, his friends, his servants. His old servants loved him and were really retainers. To women he was deferential, courtly, and chivalrous. A complete story of his life would bloom with gentle deeds. He was clean of life, clean of word, clean of thought.

"And thus he bore without abuse
The grand old name of gentleman
Defamed of every charlatan
And soiled with all ignoble use."

MEMOIR OF ARTHUR VINCENT MEIGS, M.D.[1]

BY HIS SON

EDWARD B. MEIGS

My father, Arthur Vincent Meigs, was born in Philadelphia on November 1, 1850, and lived in this city throughout his life. He was of the eighth generation in direct descent from Vincent Meigs, who came to this country from England before 1640; both his father and his paternal grandfather were physicians. As a boy, he attended the Classical Institute of John W. Faires, near the corner of Twelfth and Locust Streets, and spent most of his summers at the beautiful place of his grandfather, Charles D. Meigs, between Media and West Chester. His mother died when he was only six years old, so that he came largely under the care of his grandmother Meigs.

He entered the college department of the University of Pennsylvania in 1866, but his father was impatient to have him begin his medical course, and "took him out of college," as he has often told me, at the end of two years. He began his medical studies at the University of Pennsylvania immediately, and finished in the spring of 1871, but did not get his degree until some months later on account of the rule that degrees were not given to students under the age of twenty-one. He spent parts of the years 1871 and 1872 abroad, largely in studying medicine at Vienna; a part of his time there was devoted to the study of skin diseases under Hebra. From 1872 to 1874 he was a resident at the Pennsylvania Hospital, and immediately afterward began the practice of medicine, which he continued until his death in January, 1912. During

[1] Read April 1, 1914.

this period he published a number of scientific articles, a monograph on milk analysis, and two books dealing with diseases of the bloodvessels.

In 1878 he married Mary Roberts Browning, by whom he had three sons, who survive him. He was attending physician at the Children's Hospital, at the Sheltering Arms, and at the Pennsylvania Hospital; at one time a Trustee of the University of Pennsylvania and of the Wistar Institute; an active member of this College, and its President from 1904 to 1907. He was also at one time President of the Pathological Society, Consulting Physician at the Penitentiary and at the Pennsylvania Institution for the Instruction of the Blind. In 1899 he was elected a member of the American Philosophical Society. Such is, in very brief form, the outline of his life.

My father's chief characteristics were a passion for the truth, a strong sense of justice, an intense conservatism, a gentleness which made it difficult for him to bear the sight or even the thought of suffering, and a frankness and hatred of display which led him to dislike all kinds of material ostentation; his whole life, as it seems to me, received its color from these characteristics.

It is difficult to say whether more of my father's energy was given to the practice of medicine or to scientific research. Though certain of his traits, notably his gentleness and his unselfish honesty, made him beloved by his patients, he never regarded himself as peculiarly fitted for medical practice. The very qualities which endeared him to so many people acted in certain respects as disadvantages. His sympathy with suffering was so keen that it took away from him much of the satisfaction which less sensitive physicians derive from their profession, and his militant honesty prevented him from exaggerating the benefit which his patients might hope to derive from his services. He was deeply imbued with the conviction that we understand very little of the workings of the human body, and that the curative powers of Nature far surpass those of the physician. He thought, therefore, that the doctor's duty was in most cases merely to supply the best conditions to allow Nature to work out her cures, and that

he could only on occasion render signal aid. He regarded the lesser ills which form so large a part of every doctor's practice—colds, headaches, and the vast horde of lesser digestive disturbances—as usually due to indiscretions on the part of the patient and he considered it his duty to make this point clear rather than to prescribe some drug and allow the indiscretions to continue. And even in the case of more serious disease he had less confidence in the efficacy of the doctor's aid than had the public, or the majority of his medical contemporaries.

These things made the practice of medicine harder for him than it would be for men who had more confidence in the necessity for their ministrations; and he has sometimes told me that he was far from loving his profession as his father did. Nevertheless, he had a large practice for thirty years, and was always able to cope with the situations which confronted him. When it was necessary, he could force himself to give pain even to those who were dearest to him, and he had courage enough for the most difficult situations. On one occassion he was asked to attend a man suffering from delirium tremens, who threatened the lives of his family with a pistol. My father went unarmed into the room, and quietly persuaded the patient to hand him the weapon.

He sometimes found his opinions on practical questions opposed to those of the majority of his colleagues. On such occasions he neither insisted on his own course nor shirked his responsibilities. He would put the case fairly to the patient, or to the patient's friends: if his clients were ready to rely on him, he would accept full responsibility; otherwise he was ready cheerfully to allow the decision of that particular question to rest in other hands.

He had a quick, instinctive sympathy with the helpless and downtrodden, and I am sure that his most loving care went to certain of his patients who could make him no material return for his services. Since his death it has appeared that he had connections with certain charitable institutions which were unknown during his life even to the members of his immediate family. He was, for instance, a member of the medical corps of the French Benevolent Society of this city. His ready sympathy

caused many people to seek his advice and support, and his patients valued him, not only as a physician, but as a wise friend, whose opinions were always disinterested and worth listening to. His attitude toward his patients is well shown by the words of one of his residents at the Pennsylvania Hospital, who says: "The month's service I had under him at the hospital I shall always remember. It was most valuable. It taught me that a patient was a sick man—not a pathological abstraction—that he was to be treated and nursed, not merely to be studied. The month was most valuable to me, however, because I then got to know, to a certain degree, Dr. Meigs. I recognized in him a physician tender-hearted and absolutely conscientious to his patients, a strong, honorable, and altogether honest gentleman."

The Pennsylvania Hospital was one of my father's main interests throughout the greater part of his active life. He had the sincerest admiration for the solid and conservative way in which things were done there, and for the reigning spirit of unostentatious simplicity. I think he must have regarded his service there as his most important duty to the community, for he allowed nothing to interfere with it. He became a member of the hospital staff in 1882, and continued in it until his death; in this whole period of thirty years he never had a substitute. The following is a part of the resolution adopted by the staff of the hospital on the occasion of his death: "He was for many years the senior member of this staff and its presiding officer. During this long period he enjoyed the confidence and respect not only of his medical associates, but also of the members of the Board of Managers, and was frequently consulted by members of both bodies in matters of importance concerning the welfare of the institution in which his sound and temperate advice has been of inestimable value.

"His accomplishments as a physician, his gifts as a teacher, his interest in the scientific principles underlying the art of medicine as shown by many contributions to current medical literature, ... placed him in a very high order of medical men, and were justly rewarded by an international reputation. In his death

we have lost not only a distinguished colleague, but also a most valued friend."

My father regarded his election to the Presidency of this College as one of the greatest honors which came to him during his life. His term fell in the stormy period during which the institution made up its mind to change its place of abode; its usual peaceful scientific activities were almost forgotten in the heat of this very practical question. My father's opinions on the subject were definite, and he made no concealment of them; but I have reason to believe that he presided with absolute fairness, and that his thorough knowledge of parliamentary procedure and his ability as a presiding officer were admitted by both parties. His interest in and loyalty to the College were not in the least interfered with by the fact that many of his opinions were finally overruled.

It is, however, in the field of his scientific activity that he and I were in the most active sympathy, and, of his scientific work, that on the chemistry of milk is perhaps the most important. His first article on the subject is entitled "Milk Analysis," and was published in the *Philadelphia Medical Times*, in 1882. From 1882 to 1886, most of the time which he could spare from his practice was devoted to the milk question; the fruit of this labor was a number of other smaller articles and a monograph entitled "Milk Analysis and Infant Feeding." For a period of twenty-two years my father then devoted himself chiefly to other scientific questions, but in 1908 he again took up the chemistry of milk and worked at it until his death in 1912. The work of this latter period was carried out in the Hare Chemical Laboratory of the University of Pennsylvania, largely under the supervision of Dr. John Marshall, and with the help of several trained chemists. The results of the earlier work were to a large extent confirmed, and a number of interesting new points were brought out. A brief account of some of the aspects of this later work appeared in an article published on December 30, 1911.

The history of my father's work on milk analysis is intensely interesting from many points of view. It shows, in the first place, how long it takes to finally establish a truth, which has a

bearing on practical medicine. To oppose the establishment of such truths there rises our general ignorance of physiological processes buttressed by the unconscious determination of practitioners not to believe that they have been treating their patients wrongly. The establishment of such truths is opposed by the distrust which exists between the "laboratory" scientists and the practitioners, leading each side to ignore or denounce the results obtained by the other. In order that such truths should be established it is far from sufficient that they should be asserted by one or by a number of individuals. Their establishment requires either the most cordial coöperation between laboratory and clinical men, or, what is perhaps nowadays even more difficult, the union of clinical and laboratory activities in one individual—it requires years of earnest effort, and often hard fighting.

To the establishment of what he believed to be such a truth, my father devoted much of his energy through the whole period of his active life. The main position which he took at the beginning and has constantly maintained is that human milk contains about the same amount of fat as cow's milk, but much less protein, and more sugar. His analyses indicated that cow's milk contained about 3 per cent. of fat, 4 per cent. of protein, and 4 per cent. of sugar; while human milk contained about 4 per cent. of fat, 1 per cent. of protein, and 7 per cent. of sugar.

When my father began his work on milk in 1881, the figures given in the standard text-books of physiological chemistry to represent the quantities of protein and lactose in human milk and cow's milk were widely different from those which he obtained. The figures for protein in human milk ranged about 3 per cent.; those for the protein of cow's milk about 4 per cent. Human milk was supposed to contain about 5 per cent. of lactose; and cow's milk about 4 per cent. Since 1881 the figures found by physiological chemists for these constituents of milk have approached constantly nearer to those which were given by my father, and the results of the most recent extensive work on the subject are nearly the same as those which he obtained in 1881.

His method of working at the chemistry of milk is interesting

and characteristic. In most of the older milk analyses the total solids, fat, and lactose were determined directly, and the amount of protein was estimated by subtracting the quantities of fat and lactose from the total solids. My father always insisted that this procedure was not safe, and, in his own work he determined the protein, fat, lactose, and total solids directly, and discarded any experiments in which the sum of the protein, fat, and lactose was not nearly equal to the amount of the total solids. His results could only be questioned, therefore, by supposing that the materials which he weighed as protein, fat, etc., were not pure; and much of his later work was devoted to proving the purity of these materials. It was characteristic of his manner of working and thinking to go back wherever possible to first principles, and to rely very little on the accuracy of complicated and more or less unfamiliar technical methods.

It is, of course, impossible to say just how much his efforts counted in establishing the opinion which may now be said to be the prevalent one. He was able to devote only a fraction of his time and energy to milk analysis, and was naturally not able to keep in close touch with the ever-increasing flood of literature on the subject. Further, he was not the man to make a loud outcry about his opinions and discoveries. After he had published his monograph on the subject in 1885, he devoted himself for many years to other matters. But that he felt deeply, that he firmly believed himself to be right, and that he earnestly desired to transmit to others the knowledge which he believed would bring about the saving of many lives, we who knew him well can testify. And his return to this subject in 1908, and earnest work at it up to the time of his death, show, I think, that he considered it throughout as his most valuable contribution to the welfare of humanity.

As a food for young infants, my father used cow's milk modified in accordance with the results of his analyses by the addition of water, lime-water, lactose, and cream. Since his death I have heard of a number of mothers who believe that their infants' lives were saved by the use of this food, and have found that his

ideas have penetrated to rather unexpected places. I was surprised recently, for instance, to find the food in question described almost in my father's own words, though without any reference to him or to his work, in a popular book of advice on household matters. A more satisfactory proof that his work was appreciated is given by Dr. Winters, professor of diseases of children in Cornell University Medical College. Dr. Winters based his little book on the *Feeding of Infants* practically entirely on my father's work, and ended it by saying, "Meigs' discovery, when fully appreciated by physicians and mothers, will be the means of saving more lives than any other discovery made by medical science during the nineteenth century, as it will affect more or less the life and health of every child born into the world."

In the long interval between the publication of my father's work on milk analysis in the early eighties and his return to the subject in 1908, he published a number of articles on scientific subjects,[1] as well as his two books, *The Origin of Disease*, and *Human Bloodvessels in Health and Disease*. During this period he was particularly interested in the histology and pathology of the arteries and capillaries, and he made the interesting discovery that the capillaries of the heart actually enter the heart muscle fibers. I well remember his intense interest in the preparation of the illustrations for his books, which he always considered the most important part of them. He did most if not all of the necessary histological work himself, and his patience and success with technical matters of this sort have always aroused my greatest admiration. When it came to the question of making pictures of his specimens for publication, he went into the matter in the most thorough-going way—would spend many hours with Mr. Hermann Faber and his son, who made the drawings, and acquired a detailed knowledge of the different methods of reproduction.

It is impossible to give a sketch of my father's scientific career without mentioning the fact that throughout his life he stood

[1] A collection of the scientific articles of Arthur V. Meigs will be found in the library of this College.

opposed to most of his contemporaries on certain fundamental medical questions. He had little belief in the view, which came to be almost universally accepted toward the end of his life, that microörganisms are the cause of many if not all of the infectious diseases. This fact throws certain of his characteristics into the highest relief; and had, I am sure, a marked influence on his relations with his contemporaries.

To me my father's position on this subject seems not so very surprising; I can understand how it was brought about by his conservatism and by his independence of judgment. We had many discussions on this subject from my first year in the medical school onward, and the storm centre of these was always the subject of tuberculosis. In looking back I can see how his unwillingness to admit that the tubercle bacillus was the chief cause of tuberculosis was connected with many other things—with his dislike of new theories and of new ways of doing things, with his respect for what he had learned from his father and his grandfather, with the small ground which his actual clinical experience gave him for believing in the contagiousness of tuberculosis, and with his unwillingness to accept important views on hearsay evidence, without some kind of definite confirmatory experience of his own.

His mind had a peculiar quality of exactness; he never deluded himself into thinking that he understood a matter until he had thoroughly grasped it. This quality was connected with a dislike of most kinds of theorizing, and his attitude toward many of the great scientific generalizations of the eighteenth and nineteenth centuries was one of scepticism. He was a great admirer of Darwin, and accepted the doctrine of the transmutation of species. But he always adopted a waiting attitude toward the conclusion which to most minds seems to follow directly from that doctrine—the conclusion, namely, that all animals on the earth, including man, are only the different members of one great family group. His attitude toward the atomic theory was more or less similar; though he had the greatest interest in the facts on which that theory is based, it always seemed to him to be going too far to

imagine matter as made up of fifty or sixty kinds of little particles, all eternally different from each other. The recent great discoveries in physics and chemistry seem to more or less justify this attitude on his part.

My father had the greatest love for certain books and plays; he read *Lorna Doone*, and many of the novels of Scott, Dickens, and Cooper several times, and never grew tired of the recollection of a performance in which he had seen Irving in the "Vicar of Wakefield." But he did not like tragedies, or stories which "ended badly." Before reading a novel he usually looked at the last chapter to make sure about the ending; and I well remember his saying that he could hardly make up his mind to go on with Arnold Bennett's *Clayhanger*, after reading the horrible description of a flogging which occurs in the early part of it. He had a deep interest in history, and was thoroughly conversant with that of England, France, Germany, and Italy, and he read French and German easily and had a considerable acquaintance with the literatures of those countries.

After my brothers and I reached the voting age, politics was often the subject of our discussions. My father believed little in interference by the government with private initiative, or in help given by the government to private enterprise. It is not surprising, therefore, to find that he disliked our protective policy, and voted in both 1884 and 1892 for Cleveland, for whom he always had the greatest admiration. He had the broadest views of public policy, believing that legislation should be directed toward the general good, and turning with instinctive dislike from anything devised to benefit one community at the expense of others. It is this feeling, I suppose, which led him to oppose protection, and to take liberal views in regard to immigration and the negro question. He was much alarmed by the corruption which has been introduced into politics in this city and State, and it is pleasant to think that he saw some sign of abatement, in the city at least, before his last illness came upon him.

He was very fond of Nature and of outdoor life and had a remarkable knowledge of the trees and plants which are to be

found in this vicinity. It was seldom that he missed an opportunity to drive in the afternoon, or to go out in a boat when he was by the sea. I think his keenest pleasure was to take a three or four days' driving trip through the beautiful country which lies to the west of this city. I particularly remember his saying on one of our drives that he was convinced from his own experience that a boy could not adequately appreciate the beauty of outdoor Nature, and that he found his own appreciation growing keener with the passing years.

He had a very sure judgment of human character, and I always listened with the greatest attention to what he had to say in regard to the many personalities in whom we had a common interest. There is reason to believe that this quality gave him a large though quiet influence in the selection of men to fill responsible positions in the many institutions to which he belonged.

There was in my father's life, perhaps, little of the dramatic, but certainly much of what makes life worth living. He stood always for truth and justice, he did no man wrong, and he was the centre of a family life of which no adequate picture can be given, but to which all its members will look back as to the foundation for their belief in the possibility of human happiness.

MEMOIR OF LOUIS A. DUHRING, M.D.[1]

By HENRY W. STELWAGON, M.D.

Dr. Louis Adolphus Duhring, our late eminent Fellow—a Fellow of the College since 1871—died in Philadelphia, the city of his birth and life work, on May 8, 1913, in his sixty-eighth year. He was the last living member of his immediate family, and in fact had been so for a period of ten or eleven years. His father, Henry Duhring, and his mother, Caroline Duhring, were both of foreign birth, the former of Mecklenburg, Germany, and the latter of St. Gall, Switzerland. They came to this country in 1818, and were of the educated, thrifty and fairly well-to-do stock that characterized a considerable proportion of the emigration from the best parts of Europe, the last of the eighteenth and early years of the nineteenth centuries, a type to which the nation is largely indebted for its prosperity and progress. His father, who had already been moderately successful in his native country, became one of our most prominent merchants, and attained considerable wealth. It was not many years before they became a factor in the educated and quiet social life of Philadelphia; their best years, with a growing family around them, being passed in their city home, 259 N. Sixth Street, or East Franklin Square, at that time a fashionable, certainly a substantial, living section of the city; and in their nearby country mansion at Bala, with spacious grounds overlooking the Schuylkill River, subsequently purchased and occupied by the Philadelphia Country Club. The family was a gifted one, especially as to music, and enjoyable

[1] Read April 1, 1914.

extemporaneous evening concerts among themselves, with some chosen friends, were a feature of their life, especially in their summer abode, during the season when leisure was more abundant. The father and mother, and one or two brothers and the sister whom I had the pleasure of meeting, all possessed the charming courtesy and courtly manner of an almost past age; and these qualities were, as those who knew Dr. Duhring at all well, distinguishing characteristics of our late Fellow. One other member of the family besides Dr. Duhring—the sister, Julia Duhring—developed talent of a literary character, being the writer of several books.

Dr. Duhring was born in Philadelphia, December 23, 1845. About his boyhood and early youth I have been able to learn but little, except that he was rather quiet and retiring in his disposition, more of a student and reader than the average boy, and with a taste and talent for music; in appearance he was refined, in dress neat and even fastidious, but not to the point of foppery; with little, if any, tendency to athletic sports, and wholly unmixable with the rough-and-tumble type of plays and boys. In these respects the boy foreshadowed the man. His early education was obtained in private schools in Philadelphia, and this was followed by his entering the Freshman class of the College Department of the University of Pennsylvania in 1861. He remained in this department of the University till the end of his Junior year, three years in all. Sharing in the Unionist sentiment of the North during the troublous war period, he enlisted, in July, 1863, in the 32d Regiment, Pennsylvania Volunteers, serving three months, being honorably discharged in October of the same year. He then entered the Medical Department of the University and spent three years in medical studies, studying under the preceptorship of Dr. William Hunt and Dr. I. T. Levick, and graduating March 14, 1867. The subject of his graduating thesis was "Nervous Gout." During the first part of his medical course (1863–64) he gave considerable time to the extramural study of practical chemistry in Booth and Garrett's laboratory in Philadelphia. Immediately after his graduation he entered the

Philadelphia (Blockley) Hospital as resident physician, where he remained for fifteen months.

The impression his personality made, during the period of his medical studies and his residency in Blockley, is briefly told by one of his colleagues,[1] who thus wrote: "When I first met Duhring, in 1866, we were students in the Medical Department of the University. He was one of the very few well-dressed, gentlemanly men in the class. The medical students of that day were mostly a long-haired and uncouth race, wrapped in large gray shawls, wearing soft black felt hats, and swinging heavy canes. The few more refined ones flocked together. We were little more than speaking acquaintances during our medical course, but when we were thrown together as resident physicians in the Philadelphia Hospital, I came to know Duhring well; he was well educated, polished in manner, and thoroughly equipped for the clinical study of medicine. During the period of our residence in the hospital, he took the leadership in all that pertained to our social life. He was musical, a member of the Amphion Society of that day, and was proficient with several instruments. He organized a brass sextette among the residents, which served to enliven the depressing circumstances of our surroundings. But the sextette was not merely for our own enjoyment; it was also made the means of giving pleasure to the pauper insane, for whom several concerts were arranged under Duhring's management." This sextette, as well as others of his Blockley fellow residents, consisted of men of promise, all of whom attained a gratifying measure of success, and several of them distinction; Duhring, as the others would fully and cheerfully admit, reaching the highest pinnacle and becoming known at home and abroad. Associated in this musical band with Dr. Duhring were Roland G. Curtin, J. Ewing Mears, Samuel S. Stryker, Isaac E. Roberts, A. W. C. Beecher, and later Arthur Van Harlingen, who took Mears's place; four of whom

[1] For much of the information concerning Dr. Duhring's student, resident physician, and early professional life, I am indebted to his fellow students and colleagues, Dr. Arthur Van Harlingen, Dr. Samuel S. Stryker, and Dr. J. Ewing Mears; and especially to Dr. Van Harlingen, who was associated with him for a number of years.

(Van Harlingen, Mears, Stryker, and Roberts) are still quite active in affairs. While the pleasure afforded by this orchestra was appreciated by players and hearers, there was an amusing side, as shown in the reply from one of the sextette to my request for information regarding Duhring's residency in Blockley, and at which I am sure Dr. Duhring himself could not have refrained from smiling. This gentleman thus wrote: "While Duhring was of a quiet temperament, he enjoyed the hours given to fun and frolic; and I often think (as to the brass band) of the disturbed slumbers which must have come to many of the old out-warders during the time of our practising. Under his instructions we mastered a number of selections which we rendered with much applause at concerts given in the Insane Department, the inharmonious relations of the cerebral processes of these unhappy creatures seeming to be influenced in an anesthetic way. Once in a while a chronic epileptic would collapse, overcome by the concord of sweet sounds." Duhring was accustomed to the then not uncommon practice, especially in German families, of having wine at table, and though extremely temperate, he had established in his room at Blockley a small assortment of the lighter German wines—not for every-day consumption, but for occasional entertainment of visiting friends, and for occasional social evenings with the other resident physicians as guests. These resident physician-guests, his every-day colleagues, I have been told, when Duhring was out, sometimes made, with the usual Blockley freedom, an aggressive advance upon this concealed treasure, resulting in unexplainable shrinkage—doubtless accepted by Dr. Duhring with the same semi-amazed wonder and philosophical forbearance that a father often shows at the silly and senseless pranks of children; for this was his unconscious attitude throughout life toward those who tried to joke with or chaff him; such lightness and frivolity in full-grown men seemed wholly beyond his comprehension.

At this time and during his student days there seems to have been, in a quiet way, a distinctly social side to Dr. Duhring's character, showing itself in fondness for theatricals, music, and the

then fashionable cotillion dances. I mention this fact inasmuch as those who knew him in later years as teacher, writer, and physician, might question the existence of this one-time light-heartedness. Even later, and in fact almost up to the time of his death, as a dinner-guest in the privacy of the family, the charming social side of his character, ordinarily seemingly suppressed or non-existent, asserted itself; and his colleagues and few friends whom he thus occasionally honored were always glad to welcome his visits; especially did his charming manner and his great deference and courtesy to women endear him to the hostesses. It is believed that much of this social and lighter side of Dr. Duhring's temperament disappeared with the death of a young woman to whom he had become warmly attached, who was looked upon as his fiancée, and who died at about the time, or shortly after, he left Blockley. He withdrew more or less within himself, and became gradually more and more wrapped up in his professional work, and lived a more or less isolated bachelor life up to his death. The deaths, later in his career—1882 to 1902—of his several brothers and his sister, brought much sadness to his life; especially the death of his sister, Julia Duhring, in 1892, to whom he was devoted, and upon whom he was largely dependent for sympathy and affectionate companionship, was a blow from which he scarcely recovered. His great affection and depth of feeling for her were emphasized in his will, in which he states: "I order and direct that my executors shall have my remains interred alongside of my sister Julia." In later life he seemed almost to have become a misplaced being of the past, being much alone, having practically no confidants and no intimates. His fine and striking aristocratic appearance, with, in the last years, his rather full grayish-white beard, seemed to emphasize even more his individuality and isolation. Indeed, he seemed to be one entirely apart from the crowd—the hurly-burly manner of most of the men of the present and past decades, their athletic tendencies, their frequently talkative assertiveness, exchange of jokes, their chaffing, their not infrequent afternoon clinking of glasses, and all too often questionable and risqué stories, were entirely foreign to the taste and temperament and

pure thoughts of this exceptional man. In the presence of such he seemed entirely out of his element and held himself aloof; but in the quiet discussion of affairs, in the exchange of amusing incidents of travel, in the exchange of views regarding the general literature of the day and of the past, and in dealing with medical subjects, especially when pertaining to his own favorite branch, he was at his best, and the superiority of his trained mind over those of most of his contemporaries soon became evident. Although mild and non-combative he had, as his colleagues and acquaintances soon learned, the courage of his convictions, and was well able to sustain his views and opinions; for, while tolerant, he did his own thinking, and the correctness of his deductions and conclusions was usually admitted. He had, it is true, his peculiarities—who of us has not?—but his peculiarities were not such as affected or offended others, but rather the kind that seemed inconsiderate of himself.

One sees in this brief review of his personal life and character a striking individuality—one that stood out quite prominently, and which usually is to be found associated with persistent effort and success. He made good use of his medical opportunities while a medical student, while a resident of Blockley, while a student abroad, and in the years that followed. If the subject of his graduating thesis was of any indicative value, it would show that his choice as to the line of his practice was not made until later. His bent soon showed itself, however, in Blockley. The sufferings of an old man with a rare and painful neuroma of the skin of the left shoulder and arm aroused his interest and sympathy. His observations concerning the patient were later published, and still later a second paper, conjointly by him and Dr. F. F. Maury—the latter excising the brachial plexus for its relief. His interest thus aroused in the branch of cutaneous medicine led him to a careful search for cases in the hospital and out-wards. In Blockley, then as always, there was a large field for exploration which presented unusual opportunities for investigation and study. In the out-wards particularly there were gathered many male and female old people among whom skin affections of a chronic

character, which had baffled the ordinary efforts of the interne, were found to exist in numbers, and, as a rule, had been neglected as beyond successful treatment. This rich material and that of the syphilitic wards of the hospital offered a large and inviting field, and into this Dr. Duhring entered with enthusiasm, the hospital authorities granting him for this special work the use of a small room for examination and dispensary purposes; this small room was soon jokingly designated by his colleagues as the "diseases of the skin ward."

In July, 1868, a few weeks after his term as interne had expired, he left for Europe. There were no specialists in Philadelphia at the time, nor to any extent in any of our cities, but a number of young medical men were studying abroad in various lines who were soon to come back to America and take a prominent part in the advancement of medical science among their fellow countrymen. Such men as Blake, Warren, Wigglesworth, and Fitz, of Boston; Buck, Bulkley, and Fox, of New York; Norris, Strawbridge, Jenks, Burnett, and others, of Philadelphia, were fellow students and enthusiasts in the new learning taught at Vienna and other foreign medical centres. Duhring was one of the most active of this group, and he threw himself into his special studies with an earnestness and a devotion which excluded all other interests, and which continued until the end of his career. During his stay abroad he had attended the lectures and demonstrations of the most famous pathologists, dermatologists, and syphilographers in Berlin, Vienna, Paris, and London; in the General Hospital of Vienna, being under the tutelage of Hebra when that brilliant teacher and clinician was at the zenith of his fame. He had made personal acquaintance with him and the other great teachers, had walked the wards with them and studied their methods at close range. Even his vacations were spent in the observations of the rarer tropical and oriental diseases of the skin, and in the study of leprosy from Constantinople to Norway. His firm grasp of the subject and his appreciation of the opportunities were shown in his letters to the *Philadelphia Medical Times* just before his return—one each from Vienna, Paris, and London.

The talented and polished writer, the accurate and logical observer, the judicial mind, the literary ability, and the terse and striking descriptive power which characterized Duhring's later publications, were all clearly foretold in these early letters of his foreign student days.

After two years of study and travel he returned home, so far having had in all more than six years in medical training. Thus equipped Dr. Duhring began the practice of his specialty in Philadelphia, 1870, and immediately organized and opened the Dispensary for Skin Diseases, 216 S. Eleventh Street, with Dr. Arthur Van Harlingen as associate; Professor Samuel D. Gross, always his warm friend, was President of the Board of Trustees. He was in active charge of this institution till 1880, when he did me the honor of making me his successor; he remained as consultant from that time till 1890, when, owing to the fact that similar services had been opened in connection with the several teaching institutions, it was permanently closed, the service becoming merged into that of the Jefferson Medical College Hospital near by. It had served its purpose as a pioneer and educator. Considerable private teaching was given by Dr. Duhring, and many medical men received there their first practical knowledge of these diseases. In 1871 Dr. Duhring was elected lecturer on skin diseases in the University of Pennsylvania, and immediately organized that department of study with, a short time afterward, Dr. Van Harlingen as his assistant. He had just passed his twenty-fifth year. It was at this time, too, that Dr. Duhring, with the help of Dr. F. F. Maury, started under conjoint editorship, *The Photographic Review of Medicine and Surgery*, a monthly journal. This publication was continued two years (1870–1871, 1871–1872), but at that time the art of photography had not been sufficiently developed nor sufficiently cheapened to make the venture self-supporting. In all, forty-eight rare and interesting cases, with descriptive notes, were photographically presented; including the editors, such well-known and representative men as Samuel D. Gross, S. Weir Mitchell, Joseph Pancoast, Lewis A. Sayre, D. Hayes Agnew, W. W. Keen, J. Ewing Mears, Richard J. Levis,

William Thomson, Thomas G. Morton, Freeman J. Bumstead, Arthur Van Harlingen, Harrison Allen, Samuel W. Gross, and others of similar standing, being contributors. Many of these case pictures from this journal appeared later as illustrations in various text-books, and some continue so to appear down to the present day. Like all work that Dr. Duhring touched it was done well. During the years 1870 to 1876 he was thus actively engaged in spreading knowledge concerning his branch, being at work at the Dispensary for Skin Diseases on Eleventh Street and at the Dispensary for Skin Diseases of the University Hospital, with private graduate teaching at the former and student teaching at the latter; was making valuable contributions to current medical literature in the form of original articles and in the form of published clinical lectures; was interested and participating in the proceedings of our local societies; studying and accumulating material for his artistic life-like atlas and for his coming treatise, and looking after a beginning and growing practice. In the last year of this cycle—in 1876—a department for diseases of the skin was inaugurated at the Philadelphia (Blockley) Hospital, and Dr. Duhring was made the visiting dermatologist. He continued in sole charge till 1887, when the service, at his suggestion, was divided, and partly through his kind influence I had the honor of being made his colleague.

The first part of his *Atlas* appeared in 1876, and a new part continued to appear about every six to eight months, in all nine parts containing thirty-six colored plates. It was the work of a master, bringing credit to its talented author, to the artist Faber, and to its publishers, the Lippincott Company. It was the first undertaking of its kind in this country and in the practical selection of subjects, in its true delineation, in its artistic coloring and its life-like reproductions, this *Atlas* has scarcely been surpassed to the present day. The task was arduous, particularly so at that early time and in this country; but Duhring pushed it through to completion amid obstacles which those only can appreciate who have attempted a similar enterprise. His practical mind and his strength and determination were shown in his

selections—representations of average skin diseases as found from day to day, resisting the temptation to depict strange and monstrous cases, and remaining content to represent skin diseases as the practitioner finds them; and in this very fact lay the high value of the *Atlas* and showed the greatness of the man. Fortunate was it for American dermatology that Duhring was able to draw on his private resources for this costly enterprise, it naturally not being of a remunerative character, and not one, especially at that period, which publishers would care to finance. Scarcely had the first few parts of the *Atlas* appeared when his *Practical Treatise on Skin Diseases* was announced (1877). It was the first American text-book on this subject, and in my opinion and indeed in that of many others, the most scholarly in the English language. In clearness and simplicity of style, in its plain elegance of diction, in its terse comprehensiveness, in its expressive, carefully prepared and well-rounded definitions, in its thoroughness and understandable measures of treatment, this treatise was a classic—the work of a polished, practical scholar. As with the *Atlas*, this treatise was at once accorded a warm and flattering reception not only in America but in England and on the Continent of Europe. The time and care spent in the preparation of this book were self-evident, and I feel sure that scarcely a similar publication in the English language has appeared since without showing the influence of Dr. Duhring's treatise, and without using and partly absorbing his clear-cut definitions of the various diseases. In fact, careful thought, long-continued consideration, painstaking preparation, accuracy of observation, and a well-digested survey of literature characterized all of this great teacher's writings—in all these respects standing out in strong contrast to much of the literature of the day. Within several years a second and a third edition, somewhat increased in size, followed; and the profession of France, Italy, and Russia, one after the other, showed their appreciation and did him the honor of translating and publishing this work in their respective languages—at that time, and in fact even up to now, so great an honor had been shown to but few American authors. It had also furnished the material for the

publication of a small book in the Chinese language. And with so much work already done, and an enviable reputation already established, Dr. Duhring, at the time the first edition of this treatise appeared, had scarcely reached the age of thirty-two. His fellow dermatological workers of this, as well as in fact of other countries, soon were according this then comparatively young man the American leadership in this branch. As years went on this commanding position became more and more secure, and it was not long before he was looked upon as one of the recognized international leaders of dermatological thought. And thus stroke by stroke this modest, this unassuming, quiet-working, gentlemanly physician was, along with others, but more powerfully, lifting the specialty of diseases of the skin in this country out of the hands of quacks and ignoramuses, where the profession had too long allowed it to remain, and placing it in the realm of scientific medicine.

Dr. Duhring was a frequent contributor to current medical literature, both as to papers of a clinical and practical type and those of a distinctly analytic and scientific character. Almost all were of considerable general educational value, and many of a helpful value as to the solution of obscure and disputed problems of disease; the more important are given in the appended bibliography. But the papers which, along with his *Treatise* and *Atlas* publications, gave him an important and recognized position as one of the leading dermatological thinkers of the world, were those concerning the disease, or disease group, to which he gave the name of "dermatitis herpetiformis"—a disease since also known the world over as "Duhring's disease." In this almost continuous and elaborated series of papers—about eighteen in all, published between 1884 and 1891—he endeavored to show that various cutaneous conditions of a vesicopapular, vesicular, vesicobullous character, or of such mixed symptomatology, which had been heretofore described under several more different names as distinct affections, represented in reality but one disease. While sometimes variable and changeable in type, it was characterized by chronicity, with exacerbations and occasional comparative

remissions, herpetiformity, and pruritus, often intense; was of more or less generalized distribution, and usually was noted to follow some profound shock, nervous wear and tear, and other forms of nerve exhaustion. Herpetiformity, or the irregular grouping or bunching of the lesions in twos, threes, and fours, he considered the *sine qua non* of the disease. His contention aroused at first considerable opposition, Professor Kaposi especially, at that time the leader of the Vienna school of dermatology, attacking his views with vigor and pertinacity; but as Dr. Duhring's papers succeeded each other one after another, with his usual calm, incisive, and gentle presentation of his observations, and his clear statements of deductions and conclusions to be drawn therefrom, opposition gradually disappeared, and in the main his views were finally generally accepted and obtain at the present day. In addition to his many other writings, Dr. Duhring was a contributor to several of the encyclopedic publications of comparatively recent years. The most important and most extensive, in which my name had the honor to be associated with his, was the chapter on Skin Diseases, consisting of 150 pages, in Pepper's *System of Medicine.* Dr. Duhring was a great believer in the importance of the constitutional predisposing factors in most cutaneous diseases, and hence in the necessity for constitutional measures; and in his books and in many of his papers this belief is found directly or inferentially noted; this opinion grew stronger as he grew older, and in fact his last important paper was in support of this belief. Partly for this reason and partly for its past and present association with advertising quacks, in his later years he had become rather averse to the narrow name of "dermatology" for his specialty and had strongly advocated the broader one of "cutaneous medicine" or "cutaneous medicine and surgery." It was his efforts chiefly that led to the change to the latter term for the section on this branch in the American Medical Association; and it was the title he adopted for his later cyclopedic publication.

While an occasional contributor and participant—more especially in his early professional life—at the meetings of the various

medical societies to which he belonged, such as the County Medical Society, the Pathological Society, the College of Physicians, the State Medical Society, and the American Medical Association, it was particularly in the American Dermatological Association, of which he was one of the founders and twice its president, that his medical literary activities were displayed; and there more than anywhere else, where his true worth and great distinction were known and had full appreciation, he was at his best. His clearly expressed observations in the discussions were welcomed and listened to with great attention, always carrying with them the inherent stamp of the master. When he retired from active participation in this Association a few years ago he was elected to honorary membership. He was also interested in the Section of Cutaneous Medicine and Surgery of the American Medical Association. He was not fond of crowds, and for that reason, doubtless, was rarely in attendance at the International Medical or International Dermatological congresses, although at the latter, where he was always inquired after and his presence hoped for, his coming would have been warmly welcomed and he would have been the recipient of much attention and honor. This appreciative feeling of his foreign colleagues was reflected in his being elected to honorary or associate membership in their special societies, among which may be mentioned those of London (Willan Society), France, Berlin, Vienna, Italy and others.

Dr. Duhring was a teacher in the University of Pennsylvania for forty years. As a teacher he was always highly regarded and his lectures and clinics were always listened to with attention and respect. The disturbing lecture-room noises of varied character and other periodical evidences of exuberant spirits peculiar to male student life were unknown to him. His interest in his subject and his great pleasure in imparting information led him also to give an annual short course for several years in the Woman's Medical College of Philadelphia. It was, however, as teacher of private and limited classes that he was seen to the greatest advantage. Dr. Duhring's activities in his early professional years, and especially in the first ten to fifteen, as writer, clinician,

and teacher, soon gave him deserved reputation as a brilliant diagnostician, a skilled and fortunate therapeutist, and led rather rapidly to a comfortable practice; and by the time he had attained his thirty-fifth year he had reached an enviable and well-earned position, patients coming from all parts of our country. This continued for some years, his practice becoming larger and larger. All this while, too, he was engaged in investigating, teaching and writing, and looking after hospital and dispensary duties. Unfortunately, about 1885, his health began to fail. Symptoms of a seemingly neurasthenic character developed, and he had what appeared to be a nervous breakdown. It was at this time that I had the privilege of being made his assistant and later his associate in his office, and his assistant at the University, which continued for five years, from 1885 to 1890; and it was during this close association I learned to know so well his brilliancy of mind and his nobility of character. During this period Dr. Duhring was seeking to regain his health, being in his office and at the University only at long intervals, and only for a few weeks or a month or so at a time. It was a struggle, however, for him to keep away from work, and it was really during these years that most of his notable papers on "dermatitis herpetiformis" appeared. By 1890 his general health had somewhat improved, so that he felt able to resume charge of his office and University duties; subsequently Dr. M. B. Hartzell giving him occasional help in the former and continuous help with the latter. His chair at the University, which had been changed in 1876 from a clinical lectureship to a clinical professorship, was now, in 1890, made a full professorship with a seat in the Faculty. Dr. Duhring also became a member of its Council. At about this time he withdrew from all other appointments, devoting himself to the University, to his practice, and to literary work. He never regained his health, however, occasionally being obliged to make short breaks, and exceptionally to take somewhat long periods of rest. This enforced irregularity in the care of his practice, the uncertainty, owing to his health, of his being home or able to attend to patients, gradually, in spite of his

great reputation, led after some years to a condition of comparative retirement, although up to the date of his last illness he was seeing patients from time to time by appointment, these patients, for the most part, coming from a distance. During these years, in fact from 1885, it was a more or less continuous fight against ill health, the symptoms being somewhat vague in character, with at times cardiac irritability, occasionally ill-defined abdominal uneasiness, and other symptoms seemingly pointing to neurasthenia. In view of the autopsy findings it is not at all improbable that the constricting band of the ileum found, to which his death seemed directly or indirectly due, and which had evidently been of long duration, may have been responsible for this recurrent and finally almost continuous ill health.

In spite of being thus hampered, however, he was not willing to forego the great ambition of his later life—the writing and completion of another book entitled *Cutaneous Medicine.* This work, *Cutaneous Medicine,* was to be issued in parts, was to be almost cyclopedic, and to be based upon his collected material and observations of years. It was begun, and the first part published in 1895, the second part following in 1898. These two parts were exhaustive in character, profusely illustrated, embodying the opinions of other eminent men, and a review of literature with uncountable references, but with his own personality and experience strongly dominating throughout. It was his work alone, without help and without stenographer and typewriter, this and in fact all of Dr. Duhring's work being written in his own hand. Its reception by the dermatological world was warm and general and the reviews without exception enthusiastic. These two parts showed that at least seven or eight parts would be required to complete the work. Although evidently a tremendous strain on the author's strength, he went ahead with it, and several years later had the material for the third part ready; but, unfortunately, much of this manuscript and almost all of the illustrations were accidentally destroyed by fire, and the work halted. The blow was insurmountable. While for some time making an effort to get the material together again, Dr. Duhring evidently began

to realize that the task was too much for his failing health, and with great reluctance and disappointment the work was finally abandoned. In 1910 he resigned his professorship in the University of Pennsylvania, and was immediately made Professor Emeritus and also Honorary Curator of the Dermatological Museum; and later, in June, 1912, the University conferred upon him the honorary degree of Doctor of Laws.

It has not been customary in the memoirs of Fellows to refer to other than their deeds and work while living, but it would be very unfair to the memory of this distinguished member to pass over in silence the deeds that his benefactions are to continue for him after his death. And in these benefactions we may find, I believe, explanation of his modest ways of living and his avoidance of personal extravagance, which one occasionally heard commented upon—for these evidently had a high purpose and represented the voluntary abnegation of self in order that he might accumulate and leave ample means behind for the continued advancement of medicine both in his own special branch and also along general lines. He was equal to great personal sacrifice and self-denial for what he conceived to be a high ideal. Dr. Duhring inherited moderate wealth, had for a number of years a remunerative practice, and by judicious and fortunate investments in his later life succeeded in accumulating a substantial fortune. I feel at liberty to state that it will exceed $1,250,000. He apparently considered himself in the light of its custodian, and disposed of it largely in the interests of medicine. The University of Pennsylvania—his alma mater and the field of his lifework—will get scarcely less than $750,000; of this the General Library and the Department of Archeology and Paleontology will each receive about $175,000; the Hospital will receive, in the interest of cutaneous, cancerous, and allied diseases, and for free beds about $225,000; and the Department of Cutaneous Medicine in the Medical Department, in the interest of the study, investigation, and treatment of cutaneous diseases, and for illustrations, models, and museum purposes, about $200,000. This, our own institution, the College of Physicians, will receive $5000 as a special

fund for the purchase of books, atlases, and other works upon the subject of cutaneous medicine in its broadest sense, and scarcely less than $175,000 for general library purposes. In addition to these public bequests, among a number of other smaller ones, he left one of $5000 to the Physicians' Mutual Aid Society. So far as I can learn no medical man, in this or probably any other country, has been so lavishly generous in his bequests to medical and allied objects as Dr. Duhring, and I believe his bequest to our College of Physicians stands alone as by far the greatest ever left it by one of its members. We medical men of Philadelphia should feel much pride in this great man's remarkable medical record and in his notable and liberal benefactions.

Mr. President and Fellows of the College, I had the privilege of having, both personally and professionally, this distinguished man's continued respect, confidence and friendship, made known to me in many ways—and of the evidences of approbation, usually called honors, that have come to me in the past twenty-odd years this has been the most flattering and the greatest. And if at any time I have longed for his gifted power of expression and narration it was while writing this memoir—so that I might have been enabled to picture to you more clearly and in sharper outlines and in more lasting words the unassuming modesty, the clean, upright life, the high ethical standard, and the brilliant work and career of our departed Fellow, who in his own quiet, dignified way brought so much added distinction to our profession, to our city, and to our country.

BIBLIOGRAPHY OF DR. DUHRING'S MORE IMPORTANT PAPERS

Pathology of Alopecia Areata. Amer. Jour. Med., July, 1870, n. s., vol. lx, p. 122.

Dermatology Abroad. Letters from Vienna, Paris, and London. Philadelphia Medical Times, 1870–1, vol. i, November 1, December 1, 1870, and Jan. 2, 1871.

Use of Arsenic in Skin Diseases. H. C. Wood's Treatise on Therapeutics.

On the Study of Dermatology. Amer. Jour. Syphilography and Dermatology, April, 1871, ii, p. 104.

Two Cases of Purpura Rheumatica. Philadelphia Medical Times, 1872–3 (May 31, 1873), vol. iii, p. 545.

On Eczema Rubrum. Philadelphia Medical Times, 1872–3 (May 31, 1873), vol. iii, p. 545.

Case of Painful Neuroma of the Skin. Amer. Jour. Med. Sci., October, 1873' n. s., vol. lxviii, p. 413; and conjointly with Dr. Maury, Case of Exsection of the

Brachial Plexus of Nerves for the Relief of Painful Neuroma of the Skin. Amer. Jour. Med. Sci., July, 1874, n. s., vol. lxvi, p. 29.

Pruritus Hiemalis. An undescribed form of pruritus. Philadelphia Medical Times, 1873–4, (January 10, 1874), vol. iii, p. 225.

So-called Psoriasis Syphilitica. Philadelphia Medical Times, 1873–4 (February 14, 1874), vol. iv, p. 308.

Seborrhea Capitis. Philadelphia Medical Times, 1873–4 (May 2, 1874), vol. iv, p. 481.

Description of a Specimen of Lupus Vulgaris. Philadelphia Pathological Society Rep., 1874–5, vol. v, and Philadelphia Medical Times, 1873–74 (July 18, 1874), vol. iv, p. 660.

Angioma with Sarcomatous Degeneration. Philadelphia Pathological Society Rep., 1874–5, vol. v, and Philadelphia Medical Times, 1873–4 (August 8, 1874), vol. iv, p. 717.

On Lupus Erythematosus. Philadelphia Medical Times, 1874–5 (June 5, 1875), vol. v, p. 561.

Molluscum Fibrosum. Philadelphia Medical Times, 1875–6, vol. vi.

Pruritus Giving Rise to Peculiar Hallucinations and Subjective Symptoms. Philadelphia Medical Times, 1875–6, vol. vi.

Unknown Ova on Human Hair. Archives of Dermatology, April, 1876, vol. xi, p. 216.

Eczema Palmaris et Plantaris. Philadelphia Medical and Surgical Rep., April 1, 1876, vol. xxxiv, p. 269.

Case of a Bearded Woman (with Plate). Archives of Dermatology, April, 1877, vol. iii, p. 193.

Case of Undescribed Form of Atrophy of Hair of the Beard. Amer. Jour. Med. Sci., July, 1878, n. s., vol. lxxvi.

Bullous Eruption due to Potassium Iodide, Philadelphia Medical and Surgical Reporter, August 4, 1877, vol. xxxvii, p. 89.

On Lichen Planus. Philadelphia Medical Times, 1877-8 (April 27, 1878), vol. viii, p. 337.

Clinical Lecture on Scrofuloderma. Philadelphia Medical Times, 1878–9 (May 24, 1879), vol. ix, p. 393.

On the Treatment of Eczema Rubrum by Means of Glycerole of the Subacetate of Lead. Philadelphia Medical Times, 1878–9 (August 3, 1878), vol. ix.

A Case of Tinea Tricophytina Unguium. Philadelphia Medical and Surgical Reporter, August 3, 1878, vol. xxxix, p. 39.

A Case of So-called Xeroderma of Hebra (or Parchment-skin), Amer. Jour. Med. Sci., October, 1878, n. s., vol. lxxvi, p. 63.

A Case of Inflammatory Fungoid Neoplasm. Archives of Dermatology, January, 1879, vol. v, p. 1.

Supplement to a Case of Inflammatory Fungoid Neoplasm. Archives of Dermatology, January, 1880, vol. vi, p. 1.

Seborrhea of the Scalp and Face. Philadelphia Medical Times, 1879–80 (October 25, 1879), vol. x, p. 34.

The Rise of American Dermatology. Trans. Amer. Dermatolog. Assoc., 1879.

The Foundation of American Dermatology. Trans. American Dermatological Association, 1880, and Archives of Dermatology, 1880, vol. vi, p. 400.

Pityriasis Rubra. Philadelphia Medical Times, 1879–80 (January 17, 1880), vol. x, p. 181.

Pityriasis Maculata et Circinata. Amer. Jour. Med. Sci., 1880, n. s., vol. lxxx, p. 359.

An Improved Diachylon Ointment. Philadelphia Medical Times, 1880–1 (May 7, 1881), vol. xi, p. 494.

Observations on Rötheln. Philadelphia Medical Times, 1880–1 (March 26, 1881), vol. xi, p. 395.

An Instrument for the Removal of Superfluous Hairs. Amer. Jour. Med. Sci., July, 1881, n. s., vol. lxxxii, p. 142.

Supplement to a Case of Painful Neuroma of the Skin. Amer. Jour. Med. Sci., 1881, n. s., vol. lxxxii, p. 435.

The Small Pustular Scrofuloderm. Amer. Jour. Med. Sci., October, 1882, n. s., vol. lxxxiii, p. 70.

On the Value of a Lotion of Sulphide of Zinc in the Treatment of Superficial Lupus Erythematosus. Philadelphia Medical News, November 10, 1883, vol. xliii, p. 507.

Case of Sarcomatous Inflammatory Fungoid Neoplasm. Medical News, January 6, 1883, vol. xlii, p. 8.

A Case of Impetigo Herpetiformis; Recovery. Philadelphia Medical News, June 2, 1883, vol. xlii, p. 616.

Two Cases of Paget's Disease of the Nipple. Amer. Jour. Med. Sci., July, 1883, n. s., vol. lxxxvi, p. 116.

A Case of Ainhum, with Microscopic Examination by Henry Wile. Amer. Jour. Med. Sci., January, 1884, n. s., vol. lxxxvii, p. 150.

On the Pathology of Paget's Disease of the Nipple. Amer. Jour. Med. Sci., July, 1884, n. s., vol. lxxxviii, p. 141.

Dermatitis Herpetiformis. Jour. Amer. Med. Assoc., August 30, 1884, vol. iii, p. 225.

Notes of a Case of Dermatitis Herpetiformis, Extending Over Eleven Years Illustrating the Several Varieties of the Disease. Philadelphia Medical Times, 1883–4 (July 12, 1884), vol. xiv, p. 741.

Case of Dermatitis Herpetiformis (Multiformis) Aggravated by Pregnancy and Irregular Menstruation. The Medical News, Philadelphia, July 19, 1884, vol. xlv, p. 63.

A Case of Dermatitis Herpetiformis (Bullosa). New York Medical Journal, July 19, 1884, vol. xi, p. 62.

Case of Dermatitis Herpetiformis, Illustrating in Particular the Pustular Variety (Impetigo Herpetiformis of Hebra). Jour. Cutan. and Vener. Dis., August, 1884, vol. ii, p. 225.

Dermatitis Herpetiformis; its Relation to So-called Impetigo Herpetiformis. Amer. Jour. Med. Sci., October, 1884, n. s., vol. lxxxviii, p. 391.

Notes of a Case of Dermatitis Herpetiformis during Thirteen Years. New York Med. Jour., November 15, 1884, vol. xl, p. 540.

Preliminary Note on the Relation of Dermatitis Herpetiformis to Herpes Gestationis and Other Similar Forms of Disease. Medical News, November 22, 1884 (Philadelphia), vol. xlv, p. 570.

Case of Dermatitis Herpetiformis Caused by Nervous Shock. Amer. Jour. Med. Sci., January, 1885, n. s., vol. lxxxix, p. 94.

Case of Dermatitis Herpetiformis with Peculiar Gelatinous Lesions. The Medical News, Philadelphia, March 7, 1885, vol. xlvi, p. 259.

Relation of Herpes Gestationis and Certain Other Forms of Disease to Dermatitis Herpetiformis. Medical News, Philadelphia, October 17, 1885, vol. xlvii, p. 421; and Ueber das Verhaltniss des Herpes Gestationis und Gewisser anderer Dermatosen für Dermatitis Herpetiformis, Monatshefte f. prakt. Dermat., Hamburg, 1885, vol. iv, p. 357

Case of Dermatitis Herpetiformis of the Pustular Variety. Medical News, Philadelphia, March 5, 1887, vol. l, p. 256.

Case of Dermatitis Herpetiformis Resembling Erythema Multiforme. Medical Record, New York, April 2, 1887, vol. xxxi, p. 380.

Two Cases of Typical Dermatitis Herpetiformis. New York Med. Jour., April 9, 1887, vol. xlv, p. 404, and Deux Observations de dermatitis herpetiformis "type" (translated by P. Portalier), Ann. de dermat. et syph., Paris, 1887, 2s, vol. viii, p. 532.

On the Diagnosis of Dermatitis Herpetiformis. Amer. Jour. Med. Sci., 1888, n. s., vol. xcv, p. 135; Ueber die Diagnose der Dermatitis Herpetiformis (translated by Dr. Lier). Monatsh. f. prakt. Dermat., Hamburg, 1888, vol. vii, p. 158.

On the Relation of Impetigo Herpetiformis (Hebra and Kaposi) to Dermatitis Herpetiformis (Duhring). Amer. Jour. Med. Sci., March, 1890, n. s., vol. xcix, p. 256.

Case of Typical Dermatitis Herpetiformis. Amer. Jour. Med. Sci., June, 1890, n. s., vol. xcix, p. 595.

The Treatment of Dermatitis Herpetiformis. Amer. Jour. Med. Sci., February, 1891, n. s., ci, p. 130.

Relation of Dermatitis Herpetiformis to Erythema Multiforme and to Pemphigus. Amer. Jour. Med. Sci., April, 1897, vol. cxiii, n. s., p. 169.

Case of Unique Linear Distribution of Cutaneous Lesions of Unknown Nature. Jour. Cutan. and Gen.-Urin. Dis., New York, 1887, vol. v, p. 121.

Two Cases of Typical Impetigo Simplex. Amer. Jour. Med. Sci., 1888, n. s., vol. xcvi, p. 374.

A Case of Lepra Maculosa et Tuberosa. Medical News, Philadelphia, December 27, 1890, vol. lxvii, p. 678.

A Case of Universal Erythema Multiforme. Jour. Cutan. and Gen.-Urin. Dis., November, 1891, p. 421, vol. ix.

Experience in the Treatment of Chronic Ringworm in an Institution. Amer. Jour. Med. Sci., February, 1892, n. s., vol. ciii, p. 109.

Notes of a Visit to the Leper Hospital at San Remo, Italy. Amer. Jour. Med. Sci., March, 1892, n. s., vol. ciii, p. 294.

Case of Dermatitis Vesiculosa-neurotraumatica of Forearm. Internat. Med. Magazine, March, 1892, vol. i, p. 140.

Morphea with Maculæ Atrophicæ. Amer. Jour. Med. Sci., 1892, n. s., vol. civ, p. 551; and Trans. College of Physicians, Philadelphia, 1892, 3s., vol. xiv, p. 22.

External Treatment of Acute Vesicular Eczema. Jour. Amer. Med. Assoc., 1893, vol. xxv, p. 290.

Alopecia Areata. Internat. Clinics, Philadelphia, 1893, 2s., vol. iv, p. 364.

Valedictory Address, University of Pennsylvania Commencement. Philadelphia, J. B. Lippincott Company, 1894.

Compound Tincture of Coal Tar. Amer. Jour. Med. Sci., May, 1894, n. s., vol. cvii, p. 540.

A Case of Papulo-ulcerative Follicular Hyphomyectic Disease of the Skin; an Undescribed Disease. Amer. Jour. Med. Sci., 1895, n. s., vol. cix, p. 283 (conjointly with Dr. Hartzell), and Monatsh. f. prakt. Dermat., 1895, vol. xx, p. 137.

Diseases of the Skin (Conjointly with Stelwagon), Syst. Pract. Med. (Pepper), Philadelphia, Lea Bros., 1886, vol. iv, pp. 583–733.

The Local Treatment of the Regional Forms of Eczema. Amer. Jour. Med. Sci., April, 1897, n. s., vol. cxiii, p. 379.

The Symptoms and Nature of Erythema Multiforme. Jour. Amer. Med. Assoc., Chicago, 1898, vol. xxx, p. 898.

Treatment of Certain Chronic Inflammatory Skin Diseases. Jour. Cutan. Dis., 1909, vol. xxvii, p. 379.

THE ANNUAL ADDRESS OF THE PRESIDENT[1]

By JAMES CORNELIUS WILSON, A.M., M.D.

It is with sentiments of profound gratification that your presiding officer is able to announce to you that during the period of twelve months ending November 30, 1913, the College continued to "pursue its career of honorable usefulness."

No special meetings of the College were held during that period. At the nine stated meetings there were present in all 658 Fellows, an average attendance of $73\frac{1}{9}$—an increase of 12 over last year.

The records of the College show a gradual improvement in the average attendance at the meetings, which is due to several causes, but is clearly the manifestation of a growing interest among the Fellows. These statistics fail to indicate the actual number at our meetings, since many physicians not Fellows of the College have been present as our guests, attracted by the importance of the communications to be considered and discussed.

At these meetings twenty-four scientific papers were presented. In the reading of these seven gentlemen not Fellows of the College took part. Seven of these communications were illustrated by lantern pictures, and the greater number of them called forth interesting and illuminating discussion.

The scientific business of the College during the past year was of unusual interest and covered a wide range of topics. It acquired in several instances peculiar value from the presentation of the views of workers upon the same subject in different fields of endeavor in the form of symposia—a plan much to be com-

[1] Read January 7, 1914.

mended and worthy of adoption under suitable conditions in the future. This was the method employed in the very interesting papers of Dr. Edward P. Davis on "Thymus Death in the Newborn, with the Report of a Case," and Dr. W. M. L. Coplin in "Mors Thymica: Morbid Anatomy and Pathogenesis;" also in the important communication of Drs. Morris J. Lewis and William J. Taylor, entitled: "The Treatment of Chronic Sciatica," and in the valuable communication of William A. Stecher, B. S. G., Director of Physical Education in the Public Schools of Philadelphia, who by invitation of the Committee of Public Health and Preventive Medicine presented an account of the methods employed in the physical development of pupils in our schools from the earliest ages and their more than satisfactory results, together with that of Dr. R. Tait McKenzie, Professor of Physical Education in the University of Pennsylvania, on "Physical Education for the College and University," profusely illustrated by lantern slides. The "Symposium on Medicine in Surgery," by Drs. David Riesman and John H. Jopson, with the discussion by Drs. J. Chalmers Da Costa, M. Howard Fussell, Joseph Sailer, and John H. Gibbon, which attracted a large audience and was received with close attention and frequent applause is another example of this most instructive method of considering an important subject from several points of view. Finally the papers read by Drs. F. P. Henry, G. G. Davis, E. E. Montgomery, and Charles F. Nassau, on "The Diagnosis and Treatment of Lumbar Sacral Pelvic Pain," constituted a composite communication not only most instructive and important in itself, but also an excellent example of this method of bringing a scientific subject before an audience.

This reference to the papers read during the year would be incomplete indeed were I to fail to remind you of the deep interest and manifest gratification shown by the Fellows in the communication of Dr. J. F. Schamberg and his co-workers entitled "Research Studies in Psoriasis;" Dr. G. G. Davis on "The Operative Treatment of the Results of Poliomyelitis;" Dr. Allen J. Smith on "Congenital Anatomical Anomalies of the Heart;"

Dr. William S. Wadsworth on "A Study of Recent Records of Tetanus in Philadelphia," and Dr. B. Alexander Randall on the subject of "The Mastoid Operation; Intervention for Empyema, Caries, and Necrosis of the Temporal Bone," and the others, which will form the subject matter of the forthcoming volume of the TRANSACTIONS.

On the evening of February 17, 1913, the seventh in the series of public lectures inaugurated by the College in the winter of 1910 at the suggestion of Dr. Weir Mitchell, was delivered in this Hall before a large and brilliant audience, by Dr. John K. Mitchell. Its title, "Kings, Cardinals, Astrologers, and a Physician—a XVI Century Practitioner," gave no hint that its subject was to be the great Italian mathematician, astrologer, and physician, Girolamo Cardano (Jerome Cardan), one of the most remarkable and interesting personages associated with the revival of science in Europe. This discourse was characterized by great historical research, a literary form not often reached by medical writers, and a keen sense of humor. Those present were most pleasantly entertained and carried away a lively and very vivid impression of the personal and intellectual activities of a conspicuous figure in the medical life, such as it was, of the Renaissance. It is earnestly to be hoped that these lectures will be regularly continued and that each year we shall have one or two of them. They serve the double purpose of keeping the citizens of this community in touch with the College and diffusing a knowledge of members of our profession who have been active in the making of the history of medicine.

The evening of April 14, 1913, was devoted to the seventh Weir Mitchell Lecture, which was delivered by Professor H. P. Armsby, of the Pennsylvania State College, Institute of Animal Nutrition, whose subject was "Animal Calorimeters and the Study of Nutrition." This lecture was abundantly illustrated by lantern slides and was highly appreciated by those present, many of whom were students of nutrition from the standpoint of human and animal physiology.

The lectures of this series have become an established institu-

tion of the College and constitute one of its most important functions. It is a gratification in this connection to be able to announce that the eighth lecture of the series will be delivered in this Hall on February 25, 1914, by Professor Harvey Cushing, of Harvard University, whose subject will be "Clinical Types of Dyspituitarism."

I cannot conclude this brief review of the scientific business of the College without expressing our sense of obligation and our appreciative thanks to the Committee on Scientific Business and the Committee on Weir Mitchell Lectures and their respective energetic and enthusiastic Chairmen, Dr. H. A. Hare and Dr. Alfred Stengel.

Volume XXXIV, Third Series, of the TRANSACTIONS of the College, which contains the papers read before the College from January to December, 1912, inclusive, is of unusual value. Our TRANSACTIONS are of great importance not only as containing the record of our work in permanent form and in a way an outline of the local medical history of our times, but also as presenting an epitome of the progress of medicine. They serve also a valuable purpose as the medium of exchange with other learned societies and medical libraries. The College is under a debt of gratitude to the members of the Publication Committee for their continuous able and most efficient work. The withdrawal of Dr. William Zentmayer, for many years the editorial member of the Committee, was received with general regret.

During the session of January 1, 1913, Dr. S. Weir Mitchell made a most interesting and suggestive communication "In Regard to the Surgeons who Fell at Gettysburg and the Marking of Hospital Sites"—a matter of great historical and patriotic importance, which has been taken up at Dr. Mitchell's suggestion by the War Department of the Government.

At the meeting of November 5, 1913, your President made some brief observations appropriate to the hundredth anniversary of the death of Benjamin Rush, one of the Founders of the College, a Signer of the Declaration of Independence, and the most distinguished physician of his time, who died April 19,

1813. In this communication the Fellows were reminded of the generous gift to the College of the watch carried by Rush, by Dr. Robert Abbe, and his plan for the selection of a line of honorary custodians of this gift, the first of whom was Dr. Weir Mitchell.

The Library of the College continues to grow in importance and usefulness. The total number of volumes in the Library at the close of the College year, including the bound volumes and 8808 unbound "Reports" and "Transactions," was 101,340, an increase of 3537. Of unbound theses and dissertations the Library contains 11,227, an increase of 1104; of unbound pamphlets, 78,580, an increase of 3455. From all sources we received during the year 5391 volumes, 9760 pamphlets, and 20,798 numbers of journals. The individual donors number 504.

The number of new publications added to the Library during the year was 930. Of these 54 were written or edited by Fellows of the College.

The visits paid to the Library during 1913 numbered 8272, an increase of 943 over those of the preceding year. Of these visits 3952 were paid by Fellows of the College. The Library was kept open two evenings each week and on the six minor legal holidays. The total visits paid on these occasions were 977, an increase of 60 over the previous year. The number of books consulted in the Library amounted to 24,430, an increase of 7284 as compared with 1912. These figures include only the books supplied by the Librarian or his assistants. All visitors have access to the bound volumes on the shelves in the reading room and the Fellows have the freedom of the book-stacks. Many volumes are therefore consulted, of which no record can be kept. The number of volumes taken out during the year was 4483, an increase of 725 over the year 1912.

The total number of periodicals received was 1230, new subscriptions to American journals numbering 15, and to Foreign journals, 63.

The study rooms were in constant use throughout the year,

the average number of volumes called for and retained in these rooms being about 105.

The work of cataloguing new books and revising the catalogue is making satisfactory progress. It is earnestly hoped that the far-sighted and generous action of Dr. John B. Roberts in forming the nucleus of a Catalogue Endowment Fund will be appreciated by the Fellows, and that this endowment will in due course of time reach such proportions as to fully meet this item of expense in the maintenance of the Library.

The foregoing statistics demonstrate not only the steady growth of our Library, but they also make clear a corresponding increase in the disposition on the part of the Fellows and others to avail themselves of the advantages which it affords for the study of medicine and the associated sciences. The fear at one time entertained that the location of the new building would interfere with the use of the Library is now seen to have been ill-founded. The Library in its new housing is in every way safe as regards the care and preservation of the books and most acceptable for those who use them. It is, moreover, now clearly seen to be sufficiently convenient of access.

The following is a list of rare medical books, works of special interest, manuscripts, and other interesting and valuable gifts received by the College during the past year:

Incunabula

(Total number at this date, 174)

Albertus Magnus. De generatione et corruptione. Venetiis, Johannes et Gregorius de Gregoriis, 1495.

(Presented by Dr. James C. Wilson.)

Albertus Magnus. Liber aggregationis seu secretorum de virtutibus herbarum. Auguste, Johannes Schauren, 1496. This work is quite rare, a copy being seldom offered for sale, and it is in an excellent state of preservation.

(Presented by Drs. S. Weir Mitchell and James C. Wilson.)

Celsus, Aulus Cornelius. De medicina libri octo. Florentiae, Nicolao

(di Lorenzo), 1478. This is a superb copy of the first edition of this work.

(Presented by Drs. James M. Anders, Thomas G. Ashton, George Fales Baker, John G. Clark, John B. Deaver, Richard H. Harte, William W. Keen, S. Weir Mitchell, E. E. Montgomery, Sir William Osler, John B. Roberts, George E. de Schweinitz, James C. Wilson, S. Lewis Ziegler.

Petrus Hispanus Pope John XXI. Practica medicinae quae thesaurus pauperum nuncupatur. Venecia, Giovanni Ragazzo & Giovanni Maria (da Occimiano), 1494. This is the first dated Italian edition of the most famous of the early popular works on domestic medicine. This edition appears never to have been seen by Hain, Copinger, Brunet, Jourdan, Choulant, Eberts, Panzer, and other bibliographers; and is not in the possession of the Library of the Surgeon-General's Office. It seems probable that it is the only copy in this country.

(Presented by Dr. George E. de Schweinitz.)

Savonarola, Giovanni Michele. Opus medicinae, seu practica de aegritudinibus de capite usque ad pedes. Venetiis, Bonetus Locatellus for Octavianus Scotus, 1497.

(Presented by Dr. Richard H. Harte.)

Works of Special Interest

Bacon, Francis. [Lord Verulam.] Historie of life and death. London, Okes, 1638. An excellent copy of a very rare edition. The "Bibliotheca Britannica" mentions one English edition of 1638, but without description; and Lowndes' "Bibliographers' Manual" gives an English edition of 1633 (which is, possibly, doubtful) and one of 1638, the description of which does not agree with this copy. The catalogues we were able to consult did not contain this edition.

(Presented by Drs. James C. Wilson and S. Weir Mitchell.)

Bertholon, Nicolas. l'abbé. De l'électricité du corps humain. 2 vols. Paris, Croulbois, 1786.

(Presented by Dr. George E. de Schweinitz.)

Cardanus, Hieronymus. Arcana politica. Lugduni Batav., Elzeviriana, 1635.

(Presented by Dr. John K. Mitchell.)

Cardanus, Hieronymus. De rerum varietate libri xvii. Basileae, Petri, 1557. [First edition.]

(Fund for rare books.)

Caspal, Gaspar. Historia natural y medica de le principado de Asturias.

Madrid, Martin, 1762. This work contains the first printed account of pellagra, under the title of "Mal de Rosa." Fracensco Frappoli, in 1771, published an account of a disease prevalent among the Milanese to which the name of pellagra was given, which is sometimes quoted as "the earliest account given of pellagra."

(Presented by Dr. Joseph Sailer.)

Cheselden, William. Anatomy of the humane body. London, Cliff, 1713. [First edition.]

(Fund for rare books.)

Culpepper, Nicholas. Pharmacopoeia Londinensis. London, Sawbridge, 1683,

Presented by Dr. George E. de Schweinitz.

[Dallas, A. J.] Letter . . . relative to the late malignant fever. Philadelphia, Bradford, 1798.

(Presented by Dr. George E. de Schweinitz.)

L'Ecole de Salerne. L'Art de conserver sa santé. Traduction en vers francois par B. L. M. Paris, 1766.

(Presented by Dr. Francis R. Packard.)

Fabricius Hildanus, Guilielmus. Observationum et epistolarum chirurgico-medicarum. 2 vols. Argentorati, Beck, 1716–1717.

(Fund for rare books.)

French, John. Art of distillation. London, Cotes, 1651.

(Presented by Dr. S. W. Morton.)

Gerarde, John. Herball, or generall historie of plantes. London, Islip, 1636. The first edition of this work appeared in 1597. Copies of any edition are scarce and difficult to obtain. What is called "a fine portrait of Gerarde" is presented on the engraved title page.

(Fund for rare books.)

Glaser, Christophorus. Traité de la chymie. Paris, 1663.

(Fund for rare books.)

Harvey, William. Exercitatio anatomica de circulatione sanguinis. Ad Joannem Riolanum filium. Cantabrigae, Danielis, 1649.

(Fund for rare books.)

Jenner, Edward. Further observations on the variolae vaccinae, or cow pox. London, Low, 1799.

(Presented by Sir William Osler, Bart., M.D.)

de la Motte [Guillaume Mauquest]. Traité des accouchements naturels. La Haye, Gosse, 1726.

(Presented by Dr. J. C. Reeve.)

Leonicenus, Nicolas. De serpentibus opus singulare ac exactissimum. Antonius de Benedictis, 1518.

(Fund for rare books.)

Opera nova nelle quale ritrovareti molti bellisimi secreti novamente. n. p. n. pub. 1557.

(Anonymously presented.)

Quercetanus, Josephus. Ad veritatem hermeticae medicinae ex Hippocratis veterumque decretis ac therapeusi. Francofurti, Richteri, 1605.

(Fund for rare books.)

Riverius reformatus, or the Modern Riverius. London, Wellington, 1766.

(Presented by Dr. Richard M. Pearce.)

de Robledo, D. A. Compendio cirurgico. Barcelona, Figuero, 1702.

(Presented by Dr. George E. de Schweinitz.)

Wedel, Georg Wolffgang. Theoria saporum medica. Jena, Krebs, 1703.

(Fund for rare books.)

Manuscripts

Fothergill, Anthony. Copy of [his] will. [London, 1810.]

Presented by Sir William Osler, Bart., M.D.

Hairaullah Effendi. [Medical manuscript in the Turkish language, 17—.] This manuscript, in the author's own handwriting, is the work of Hairaullah Effendi, the first of a celebrated line of Turkish physicians, and chief physician of his era, in the 12th Turkish Century (18th century A.D.).

(Presented by Dr. S. Weir Mitchell.)

Mettauer, J. P. [Manuscripts.] 3 vols.

(Presented by Dr. George Ben Johnston.)

Norris, G. W. Record of all capital operations at the Pennsylvania Hospital (1836–1849).

(Presented by Dr. George W. Norris.)

Servetus Villanovanus, Michael. Christianismi restituto. Typewritten copy of the pages which relate to the circulation of the blood (pp. 169–172) of the 1553 edition.

(Presented by Dr. S. Weir Mitchell.)

Other Interesting Accessions

Clay medical tablet, Assyrian, dating from the seventh century B.C. This tablet is of an extremely rare type, bearing in cuneiform characters a series of prescriptions for stated ailments, accompanied by prayers or exorcisms appropriate to accompany the medicine.

(Presented by Drs. S. Weir Mitchell and Richard H. Harte.)

Fuchs, Ernst. Photograph of a sketch.
(Presented by Dr. George E. de Schweinitz.)

Jenner, Edward. Jenner's first inoculation with vaccine, May 14, 1796. A reprint of the painting by Gaston Mélingue, 1879.
(Presented by Dr. George E. de Schweinitz.)

Morgan, John. Miniature. Silver cigar cutter belonging to John Morgan.
(Presented by Miss Julia Morgan Harding.)

Reed, Walter. Portrait of Major Walter Reed.
(Presented by Dr. A. C. Abbott.)

Trinity College, Dublin. Photograph of the interior of the library.
(Presented by Dr. Richard H. Harte.)

Virchow, Rudolf Ludwig Karl. Photograph.
(Presented by Dr. A. Bern Hirsh.)

Harvey, William. Photograph of the statue of Harvey at his birthplace, Folkestone.
(Presented by Dr. Alfred Hand, Jr.)

An Oil Painting

Portrait of Dr. Charles T. Hunter, by Rittenberg.
(Presented by Mrs. Elizabeth R. Moulton, the sister of Dr. Hunter.)

The collection of incunabula was increased during the year by five of these rare volumes. Among these the most important is the superb copy of the Edito princeps of Aulus Cornelius Celsus, De medicina libri octo, a fine large copy, bound in red morocco, gilt, Harleian style, by J. Clark. Florence, Nicolo di Lorenzo, 1478. This remarkable volume bears above the colophon the signature in fading red ink of *Georgii Antonii Vespucci liber,* the paternal uncle of Amerigo Vespucci, a Dominican friar and savant, who gave public lessons to the youth of Florence. It was presented to the Library of the College at the suggestion of Sir William Osler by fourteen of the Fellows and must be regarded as the chief among the treasures of the collection.

During the year the incunabula were carefully looked over, repairs were made when possible, and forty volumes were rebound for their better preservation.

The collection of loose portraits in the library now numbers 1451, including 448 of Fellows of the College, properly arranged for ready inspection. This collection does not include the paintings, framed engravings, and mounted portraits in printed books and scrap-books. These are, however, all catalogued and the total number to be found in the Library is 5658. The entire collection has been obtained by gift or exchange. It is hoped that this mention of the subject will help to arouse the interest of the Fellows so that the collection may be augmented until the list of the portraits of the Fellows is complete and that of other physicians and surgeons may become a conspicuous feature of the Library.

The financial condition of the Library continues to improve. It was strengthened during the past year by the Charles A. Oliver Memorial Fund, $806.14, by an addition to the J. Ewing Mears Fund of $1000, and an addition to the John B. Roberts Catalogue Endowment Fund of $500. The total amount of the Library Endowment Funds at the end of the College year was $88,492.74, the income of which amounted to $3807.59.

It is proper in this connection to add that under the will of our late Fellow, Dr. Louis A. Duhring, whose estate will probably be settled in the near future, the College will receive for the uses of the Library an endowment of $5000, the income of which will be devoted to the purchase of publications relating to Dermatology; and one-fifth part of the residuary estate "for general library purposes." Nor can I refrain from alluding to the generous gift of $15,000 on the part of Misses Fannie S. and Anna J. Magee and Mr. James R. Magee shortly after the December meeting for the endowment of a fund in memory of their late brother, to be known as the "Horace Magee Memorial Book Fund," the income of which is to be used in the purchase of works on Internal Medicine in any of its branches.

We may well be proud of our Library. In number of books of all kinds and in other possessions of historical value and importance it holds a very high place among the Medical Libraries of the world. The statistics to date are not available, but its place

is somewhere about sixth, perhaps fourth, upon the list. The fact that those which outrank us, like the Library of the Faculty of Medicine of Paris, or our own Library of the Surgeon General's Office of the United States Army, are great municipal or government institutions, only serves to accentuate our success in its development and to stimulate us to renewed efforts to increase its power and usefulness.

At the February meeting the very valuable and interesting relics of John Morgan, consisting of a miniature and silver cigar cutter, gifts of Miss Julia Morgan Harding, were presented to the College by Dr. George Fales Baker. At the same meeting the Assyrian Medical Tablet, dating from the seventh century B.C., the gift of Dr. S. Weir Mitchell and Dr. Richard H. Harte, was presented by Dr. F. P. Henry, the Honorary Librarian.

This tablet has been deciphered and thoroughly studied by Professor Morris Jastrow, Jr., who made it the subject of a most important discourse in connection with Babylonian and Assyrian Medicine at a recent meeting of the Section on Medical History. It is a matter of congratulation that arrangements have been made for the publication of Dr. Jastrow's lecture with photographic reproductions of the tablet in the TRANSACTIONS of the College.

At the November meeting a portrait of the late Dr. Charles T. Hunter, by Henry R. Rittenberg, was presented on behalf of the donor, Mrs. Elizabeth R. Moulton, by Dr. George E. de Schweinitz, who accompanied his presentation remarks with a brief but interesting sketch of our late Fellow. On the same occasion Dr. S. D. Risley read a memoir of the late Dr. Roland G. Curtin, and at the December meeting Dr. McCluney Radcliffe read a memoir of the late Dr. Charles A. Oliver.

At the December meeting the subject of a Roll of Honor of Fellows of the College who have served their Country in time of war, first suggested by Dr. Weir Mitchell in 1910, was again taken up for consideration and a resolution was passed by which a committee was appointed to review the work previously done and report to the College with the purpose of publishing a suitable

memorial volume. I cannot too strongly urge upon the Fellows the necessity of rendering every aid in their power to this Committee in order that this important matter may be brought to an early conclusion.

The financial condition of your College as set forth in the Treasurer's report, by Dr. George Fales Baker, Chairman of the Finance Committee and Acting Treasurer in the temporary illness of the Treasurer, Dr. John B. Roberts, is satisfactory.

The total assets of the College on December 1, 1913, were as follows: Real estate, at the valuation of 1912, $561,091.16; invested funds, $198,324.75, an increase over 1912 of $6387.62, making a total of $759,415.91. This total does not include the endowment of the Thomas Dent Mütter Fund for the Mütter Museum, amounting to about $30,000, nor the Nathan Lewis Hatfield Prize Fund, now nearly $9000, both of which are held in trust for special purposes by separate Boards of Trustees appointed by the Founders.

The actual income of the College, excluding income of Trust Funds for special purposes, but comprising the proceeds from subscriptions, annual contributions, receipts of the Hall Committee, and the Nurses' Directory for the year 1913 amounted to $28,529.89, while the expenditures amounted to $29,223.65. The unexpended balance to the credit of the College, other than trust funds, permanent fund, building fund, and subscriptions, was on December 1, 1913, $895.34.

A summary of the receipts of the Treasurer, as per cash book, December 1, 1913, shows:

Balance on hand December 1, 1912	$21,205.76
Receipts (subscriptions, "trust funds," cash from the sale of securities for trust funds)	41,436.15
	$62,641.91
Expenditures (disbursements of the Treasurer, including income from "trust funds" and cash paid for securities for the "trust funds")	46,889.10
Balance on hand	$15,752.81

It is right in this connection to state that the securities in the custody of the Pennsylvania Trust Company have within a few days been inspected by the proper officers of the College and found to correspond to the Treasurer's list in every particular.

The committee having charge of the utilization of the lot of ground conveyed to the College by Mr. Eckley B. Coxe, Jr., for a suitable memorial to our late Vice-President, Dr. Wharton Sinkler, has completed its labors and transferred the custody of the garden to the keeping of the Hall Committee. The annually recurring beauty of this memorial will not only give pleasure to every one beholding it, but it will also symbolize our affectionate remembrance of a colleague who long and faithfully served the College, and our high appreciation of the friend whose generosity enabled us to create this monument to his memory.

The Finance Committee and the Hall Committee have discharged their responsible and exacting duties with untiring vigilance and sound judgment. The thanks of the College are tendered to the Fellows composing them, to Mr. Charles Perry Fisher, Librarian and Superintendent, to Miss Zelner, the keeper of the accounts, and to Miss Brown, the secretary of the Nurses' Directory. The condition of the building and all its departments, and in particular the efficient management of the Library, bear the fullest testimony to the untiring zeal, the ability, and the organization of our official staff.

The Committee on Public Health and Preventive Medicine has, under the chairmanship of Dr. James M. Anders, justified its organization among the standing committees. There is abundant opportunity for it to continue its work in asserting the influence of the medical profession through the College and serving the city and State in all questions of the public health.

The Committee on the Alvarenga Prize has been unable to make an award, no essay worthy of the prize having been presented.

The Committee on the Nathan Lewis Hatfield Memorial Prize has thus far received no essay worthy of the award. This fund of $6000, endowed in 1898, has accumulated until it now amounts

to nearly $9000. On two occasions only have essays of sufficient merit to receive the prize been submitted. For this reason, at the suggestion of your President, and with the concurrent assent of the donor, Mr. Henry Reed Hatfield, for himself and as trustee for the estate of his late brother, Mr. Walter Hatfield, the Trustees, the Committee, and the officers of the College, a supplementary Deed of Trust has been executed and placed upon record, enlarging the scope of the foundation so that under specified conditions the income may be used as a prize, or for an honorarium to lecturers, or both, and likewise changing its title to the Nathan Lewis Hatfield Memorial Prize and Lectureship Fund. This supplementary deed of trust will be printed in full in the forthcoming revised issue of the Charter and By-laws.

At the December meeting a letter from Dr. S. Weir Mitchell was read in which he made the presentation of $1000 as an addition to the Weir Mitchell Entertainment Fund, and further stated that he hopes in time to complete the amount originally intended, $10,000. The College by resolution accepted with thanks the generous gift of Dr. Mitchell.

At the May meeting the College approved of a Federation of the Medical and Scientific Lectureships in Philadelphia, under an agreement with the Rush Society for the Correlation and Support of Medical and Biological Lectures in Philadelphia. Under this agreement the respective lecture Committees select their speakers and determine the place, date, and other details of the lectures in their respective charge, but in addition report these arrangements to the Secretary of the Rush Society. The Society in turn undertakes to render assistance in advertising the lectures and under certain requirements to give them financial support. This federation will, it is hoped, increase the effectiveness of the lectures in Philadelphia without interfering with the autonomy of the respective organizations and aid all in securing increased publicity, attendance, and usefulness. The organizations thus far represented are the Rush Society, the College of Physicians, the University of Pennsylvania, the Philadelphia Pathological Society, and the Mütter Museum.

At the June meeting the Treasurer reported that he had received $206 from individual Fellows as subscriptions to the Lord Lister Memorial Funds, and that in accordance with a resolution of the College this amount had been divided into equal parts, of which one part had been forwarded to the Glasgow Committee and the other part to the London Committee.

At the October meeting the College appropriated $200 to defray the expense of a new edition of the Charter, Ordinances, and By-laws.

During the year the following important amendments to the Ordinances and By-laws were adopted:

An amendment creating the office of Clerk of the College, not necessarily a Fellow, defining his duties and stating that for these duties he shall receive such appropriate salary as the College shall from time to time determine.

An amendment providing for a quorum of not less than twenty Fellows as necessary for the election of officers or members of the standing committees of the College.

An amendment stating that non-resident Fellows shall not be entitled to vote at any meeting of the College.

An amendment declaring that no Fellow of the College who has been notified by the Treasurer that he is in arrears shall be eligible for any office or elective standing committee, nor permitted to vote at any general or special election of the College until his indebtedness shall have been discharged.

Three special committees were continued from the year 1912, namely, the Building Committee, the Committee on a Gown for the Officers of the College, and the Committee on a Design for a Banner for the College. No report has been received from these Committees during the past year.

In the course of the year just ended the College has lost by death eight Fellows:

Dr. William R. Dunton, elected a Fellow in 1860, died on May 14, 1911. Trained as a resident physician in the Pennsylvania Hospital and always interested in its welfare, he early

entered practice in Germantown, where he achieved a successful and most fortunate career. Surviving his contemporaries, he retired to an estate at Montrose, Pennsylvania, where he ended an honorable and useful life so peacefully that his death was unknown to his Fellows of the College until more than a year had elapsed.

Dr. William R. Hoch, elected a Fellow in 1894, died on December 7, 1912.

Dr. Orville Horwitz, elected a Fellow in 1888, died January 28, 1913. An accomplished and successful surgeon, his abilities were recognized early in life and he was honored in rapid succession with appointments as Professor of Genito-urinary Surgery in the Jefferson Medical College, Surgeon to the Jefferson Hospital, to St. Agnes' Hospital, to the State Hospital for the Insane, and Consulting Surgeon to the Jewish Hospital.

Dr. Lewis W. Steinbach, elected a Fellow in 1892, died February 10, 1913. Not only an able practitioner of medicine and a surgeon of great skill, he was also a man of unusual general information and the most charitable disposition. As a teacher his success won the admiration and devotion of the classes of the Philadelphia Polyclinic, in which he held the post of Professor of Clinical and Operative Surgery. As Visiting Surgeon to the Jewish Hospital and to the Philadelphia General Hospital his influence alike upon patients and the resident physicians was that of a strong nature imbued with lofty sentiments. At a memorial meeting shortly after his death forty Hebrew Charitable Organizations of which he had been a member were represented.

Roland G. Curtin, elected a Fellow in 1884, died March 14, 1913. A graduate of the Medical Department of the University of Pennsylvania, he held during a long and unusually active professional life many important hospital and teaching appointments and was widely known as a successful practitioner and consultant. Deeply interested in medicine as an organized profession, Dr. Curtin was an enthusiastic member of many medical and other scientific societies, in several of which he was an acknowledged and

efficient leader. He had a fine gift of letters, and wrote many valuable medical papers and addresses and other interesting communications. His singularly fortunate disposition and lofty character won the affection and admiration of many friends alike among the people and in his own profession.

Dr. George McClellan, elected a Fellow of the College in 1875, died March 29, 1913. Gifted with an enthusiastic love of art and unusual ability as a teacher, he early devoted himself to anatomy with great success. His *Regional Anatomy,* illustrated with remarkable colored drawings by his own hand, at once gave him an international reputation, which was increased by his *Anatomy in its Relation to Art.* He was early appointed Professor of Anatomy in the Pennsylvania Academy of the Fine Arts, and later Professor of Applied Anatomy at the Jefferson College, positions which he held at the time of his death. For some years, until his death, he was Chairman of the Committee on the Mütter Museum. He was deeply interested in the College and a frequent contributor to its scientific work, his communications being always most interesting and suggestive. His sudden and almost tragic death made a deep impression upon the community.

Dr. Arthur Ames Bliss, elected a Fellow in 1894, died May 1, 1913. Of a quiet and retiring disposition, Dr. Bliss pursued a life of great usefulness and success in the specialty to which he devoted himself. Long identified with it at the German Hospital, he was Chairman of the Section on Otology and Laryngology in the College of Physicians at the time of his death. He was a judicious and skilful operator, but endowed with the wisdom to hold his hand when the occasion demanded it. His devotion to his patients was remarkable. He was an omnivorous reader, and greatly interested in the philosophical aspects of medicine.

Dr. Louis A. Duhring, elected a Fellow in 1871, died on May 8, 1913. Early interested in dermatology, he confined himself strictly to that specialty during his active professional life. His contributions to the subject were of the highest order and won

for him great distinction both in this country and abroad. His books are of monumental importance, and learned societies in many countries conferred upon him the title of Honorary Member. His interest in the College of Physicians was life-long, and he made it the beneficiary of his will in a bequest to the Library for the endowment of a fund for the purchase of books on dermatology and an interest in his residuary estate for the general purposes of the Library.

Dr. Ralph S. Lavenson, elected a Fellow in 1908, died at Los Angeles, July 6, 1913. An earnest and ambitious student, he devoted himself to the study of morbid anatomy and pathology, receiving shortly after graduation the appointment of Assistant Demonstrator of Gross Morbid Anatomy in the School of Medicine of the University of Pennsylvania and later that of Assistant Pathologist to the University Hospital. In 1909 he became Instructor in Medicine (on leave of absence), which position he held in 1910–11. His death was due to pulmonary tuberculosis, which developed while he was engaged in his laboratory work.

Five Associate Fellows died during the year: Dr. John S. Billings on March 11, Professor Sigismund Jaccoud on April 26, Sir Jonathan Hutchinson on June 23, Dr. Reginald Heber Fitz on September 30, and Dr. Charles McBurney on November 7.

Three Fellows have resigned and one forfeited his Fellowship. Twenty-three new Fellows have been elected. The net gain is eleven.

The roll of the College December 1, 1913, showed: Fellows, 467; Associate Fellows (American), 22; Associate Fellows (foreign), 17; Corresponding Members, 2; a total of 508.

The founders of this institution of learning builded better than they knew, how much better no one can know who has not made himself familiar with its wonderful history and its present splendid condition. It has become a great power for good in our local profession and its influence extends far beyond our borders. To be a Fellow is an honor. To have been chosen to be for the time your presiding officer is an honor indeed. I thank you for it.

ONE HUNDRED CASES OF MALIGNANT DISEASE TREATED WITH RADIUM[1]

By W. S. NEWCOMET, M.D.

Where radium is to be employed the quantity should be sufficient to dispel all doubt that failure to obtain the desired result might possibly be due to that cause alone. We are well aware that the amount used in the treatment of cases included in the appended list was much smaller than is usually recommended; however, as the supply was limited and the demand great, it behooved us to use such means as was at our command for the relief of these hapless cases which came under our observation. In all but a few exceptions, in this list of over 100 cases, radium was only employed after all other methods had failed, many of them had previously received other forms of radiation, such as the *x*-rays, before claiming our attention, or where it had not formerly been used, it was given the preference, for a two-fold reason: (1) Because we were better equipped for its administration; and (2) our supply of radium was extremely limited. The only variation from this rule was in those instances where for some reason *x*-rays could not be employed. These exceptions referred to were included in this list to exclude any error of judgment in preparing a special list for the correlation of results that might be misleading.

From the individual reports of cases results often appear to be extraordinary, but frequently upon closer examination it will be found that the element of time has not been given sufficient

[1] Read February 4, 1914.

cognizance, nor has the material been properly digested before arriving at ultimate conclusions. The word cure is too often used to imply that the local disease has temporarily disappeared, thereby giving a false interpretation of the results *per se*, and one of the best articles upon this subject has been published by Mr. Pynch, of the Radium Institute of London, which establishes a standard, and is a classic from the fair and impartial manner in which his deductions have been made. Here the results cannot be questioned, as the amount of radium employed and the technique adopted dispel all chance of error that might be due to absence of these conditions. In Germany the use of mesotherium has to some extent displaced radium, it being claimed by some individuals that the character of radiation is far more active, and therefore the result to be expected should be proportionally better; here again the element of time is needed for the proof of this statement. The objection that is raised to the thorium preparation is that the rapid disintegration requires constant correction, at frequent intervals. If this procedure is not observed the actual amount of radiation given at a definite period would be unknown. It is not difficult, however, for one accustomed to its use to make this calculation, but it must be remembered that its total disintegration is only a matter of a few years.

The prevailing idea that these radio-active elements will prove to be a panacea, is false, and has mislead many, giving them a mistaken feeling of security that has often caused these unfortunate sufferers considerable inconvenience. It cannot be denied that in some instances it has afforded relief, sometimes only temporary, often permanent, that is most marvelous; and it has, and will have a distinct field of usefulness in a certain class of cases and so far there seems to be no means to substitute these radio-active elements although at the present time we cannot have hard and fast rules to govern the exact character of case that will be benefited by this form of radiation, yet it must be admitted that there exists certain conditions which are, and will be, treated with better results by the Röntgen ray. This is well exemplified in some forms of carcinoma of the breast.

It might be said in comparison with the Röntgen ray, aside from any peculiar physical property these radio-active elements may possess, that there are two local conditions favoring their use: (1) In the treatment of disease in cavities, such as the mouth, rectum, or vagina; and (2) where an intense local action is desired with little disturbance of the surrounding tissue. The technique used, in all forms of radiation, is a matter for serious consideration, and calls for detail in future study. We have all heard references made to some conditions relieved by one operator which have not been previously benefited by another; and it must not be inferred, from this, that the latter operator had more radio-active material, possessed a more refined technique or better Röntgen apparatus than the former; indeed, in several instances that have come under observation the conditions were rather the reverse, otherwise this point would not be worth considering. While on general principles, large amounts of any of the radio-active elements should be employed, yet some malignant processes will yield to extremely small quantities; and many instances have been reported where the amount used has been less than 5 milligrams of radium element.

The word "cure" has been omitted in this list of cases, and where the local condition disappeared the letters W. M. E. D. which indicate "without manifest evidence of disease" have been adopted. "Marked improvement" has been used, where healing was complete locally, but disease was more or less evident in adjacent structure. "Improved" where the ulcerations for a time show some sign of decided improvement. The remaining words call for no explanation. It seems needless to remark that in all instances the diagnosis was confirmed by microscopic examination, and where this was not possible it was regarded as non-malignant; for example, the recurrent papillomas and cysts were in reality not actual benign tumors.

The general weakness of this list can be readily seen in the deep cases, such as carcinoma of the esophagus, breast, rectum, etc., possibly attributable to the lack of sufficient amount of radio-active material, thereby not being able to give the required

amount of deep radiation; again referring to the report of the Radium Institute of London, we find a wide variation between the deep and superficial conditions. In a series of cases of 101 rodent ulcers, 31 were apparently cured, 41 improved, while in a series of cancer of the rectum, including 43 cases, 1 was cured and 9 were improved.

The two cases of epithelioma of the eyelid might possibly have been treated by the *x*-ray, however, as in each instance there were other reasons for not adopting that form of radiation, there is not the least doubt that in all probability they would have made as prompt a recovery, but it is questionable if it would have occurred with as little inconvenience. This also refers to one case of epithelioma of the forehead, and while many such cases have been reported as cured by the use of radium, it must be remembered, that the great majority would have healed as well under the influence of other forms of radiation. This, however, cannot be said about such conditions as carcinoma of the uterus, of carcinoma within the mouth; in both there appeared for treatment cases that were almost moribund; they reacted and have been temporarily restored to health. In some of the uterine cases the hemorrhage was checked enough, a week or two after the first application, to enable the individual to go about her routine work, after having been absolutely useless and practically bed-ridden. The results are often most gratifying, and strange as it may seem, and contrary to the prevailing idea of massive doses, this happy outcome was produced in one instance, by the use of only 1 milligram of radium element; report of which, was made a few years ago in detail. The absolute disappearance of the disease in these late cases seems to be exceptional, even where a large amount of radium has been employed, and while comfort with temporary healing is often afforded them, we must not forget that old adage of the "ounce of prevention."

No doubt all malignant processes removed by operation will be radiated in the near future, for it seems that any agent of such value in these late cases should be a valuable postoperative

procedure. In carcinoma in and about the mouth we are again forced to acknowledge the powers of radium and mesothorium. Although the results generally do not appear to be so good as those of the uterus, they have in several instances been most gratifying; here again we notice the same wide variation of results. Often those which seem to be the most favorable from their history and general appearance are in the end the most fatal; conversely, those which appear to be extremely unfavorable, change for the better with such ease that it is often inconceivable. In these two last mentioned regions there must be some direct action between the variety of disease and the form of radiation for these favorable results were not observed in cancer of the colon. Results seemed to be better where it was possible to bring the radium in direct application in the same manner as in the mouth and uterine conditions.

That the action of these rays differ from the ordinary *x*-rays is well shown in this list where good results follow the application of radium after previous use of *x*-rays failed; notably in the two cases of sarcoma and the one of papilloma. This fact has been observed by others, and in a sufficient number of cases to prove that there is a difference in the so-called selective action of these rays.

In ending, while not expressing any general conclusions, attention might be called to the fact that all the results here given were accomplished by applications from 1 to 20 milligrams of radium, with very little filtration, where the condition was superficial; in those of any depth it was customary to use a screen consisting of a piece of lead, a millimeter in thickness, wrapped again in cotton and rubber tissue. (Often a glass or celluloid tube was used in place of the rubber tissue.) In several instances burns were produced but healing promptly followed.

	W.M.E.D.	Marked improvement.	Improved.	Doubtful.	Not improved.	Left.	Died.	Remarks.
Epithelioma:								
Ear	..	..	..	..	1			
Eyelid	2							
Face (rodent ulcer)	1	..	..	..	12	..	..	? operative treatment substituted.
Forehead	3							
Hand	..	1						
Larynx	..	..	1					
Lip	..	2	..	..	1			
Mouth	..	..	..	..	4	..	1	
Buccal surface	..	1	?	..	..	..	..	? operative treatment substituted.
Leukoplakia	1	..	1	..	1			
Nose (rodent ulcer)	3	..	..	1				
Palate	1	..	..	..	5	..	2	
Pharynx	..	..	..	..	1			
Scalp	..	..	1					
Tongue	..	..	..	..	..	..	1	
Carcinoma:								
Axilla and neck	..	..	1	..	..	1		
Breast	..	..	..	..	3			
Colon	..	..	..	1	1			
Face and neck	..	..	..	..	1			
Nose, mucous surface	..	1	..	..	2			
Palate	..	..	..	..	1			
Esophagus	..	..	..	..	1			
Pharynx	..	..	..	..	..	..	1	
Rectum	..	..	..	..	3	1		
Tongue	..	..	1	..	2	?	..	? Was improved.
Tonsil	..	..	..	..	2			
Uterus, body	..	..	2	..	1			
Uterus, cervix	..	2	6?	..	4	2	..	? operative treatment substituted.
Uterus and vagina	..	..	..	..	1			
Uterus, vagina, and bladder	..	..	..	..	..	1		
Vagina	..	..	..	..	1			
Vagina and bladder	..	1						
Sarcoma:								
Antrum	..	..	..	..	1			
Choroid	..	..	..	..	1			
Multiple	..	..	..	..	1			
Orbit	..	1						
Osteo, orbit	..	..	..	..	1			
Skull	..	..	..	..	1			
Sternum	..	1						
Serocystic of face	..	..	..	..	..	1	..	
Papilloma:								
Chest	1							
Tongue	..	..	..	..	..	..	1	Died of heart disease while under treatment.
Mouth and leukoplakia	1							
Cyst (mucous) mouth	1							
Nevus cavernosus	..	1						
Spring catarrh	..	..	..	..	1			
Chloasma	..	..	..	..	1			

DISCUSSION

Dr. Edward A. Shumway: I am particularly interested in the young boy, the last patient shown by Dr. Newcomet. He has been under my observation since 1900, when I operated on him for convergent squint. When I first saw him he showed in his optic nerve head changes which we look upon as pseudoneuritis. The results of the operation were excellent. He came to me a number of times for change of glasses, and was comfortable until 1911, when he commenced to have severe headache associated with vomiting and staggering toward the left side. I saw him January, 1912, when there were unmistakable evidences of optic neuritis. The symptoms became much worse, nystagmus developed, and the staggering increased. He was seen by Dr. Spiller and Dr. Frazier who corroborated the diagnosis of cerebellar growth. Operation was done by Dr. Frazier in March, 1912, and a cyst the size of a walnut was found on the upper surface of the left cerebellum. This was evacuated and the wall removed. No growth, apparently, was found underneath. After the operation the symptoms were entirely relieved, and during the following winter he went through his final year in the High School, graduating well up in his class. Last Spring he commenced to have trouble after his High School work closed, and when I saw him in August, 1913, there was a decided return of the symptoms: vomiting, throbbing pain in the head and severe headache with recurrence of the optic neuritis. Upon Dr. Frazier's return last September, he operated and found a solid growth in the cerebellum on the left side. A small piece excised and sent to the pathologist proved to be a glioma. Because of the situation and size of the growth Dr. Frazier considered the case inoperable, and the boy was believed hopelessly doomed. The father demanding that something be done, the boy was referred to Dr. Newcomet to see what might possibly be accomplished with radium. The result is shown as you see him now. During the Fall, after his second operation, his symptoms were not very much improved. The staggering was present. He still had severe pain, throbbing in character, and severe headache. I saw him last week and these symptoms had entirely disappeared; the optic nerves were perfectly normal, the vision sharp, —6/5 each eye without any contraction of the visual fields, and apparently the boy was much improved. It is possible that the improved condition of the optic nerve head may be the result of the second operation. The general symptoms, however, were not relieved by the operation. Whether this improvement be temporary, and the symptoms return with greater severity, remains to be seen. At least, the boy has had several months'

relief from the headache, vomiting, etc., and the case is certainly very remarkable and interesting in that respect, and one well worthy of report.

Dr. Charles H. Frazier: I have not much to add to that which Dr. Shumway has already stated concerning this case. There is no doubt that after the second operation, at least, as long as the patient remained in the Hospital, he was not much relieved of the symptoms present before operation. It appears evident from the report of Dr. Shumway and Dr. Newcomet that the application of radium has had a very positive influence upon the growth. We have had several cases, however, in which improvement following a simple decompressive operation in conditions precisely similar to this case, has continued over a period of at least three years. In one case the symptoms have not recurred in some eight years. There is reason to believe, and this fact is borne out by Sir Victor Horsely and others, that in exceptional cases there is a cessation of growth in intracranial tumors, and that the growth may even undergo retrograde changes.

Regarding the use of radium in tumors of the brain, I have had several conferences with Dr. Robert Abbe of New York, and we have discussed the feasibility of using radium directly at the time of the operation, not only in brain tumors generally, but possibly in lesions of the pituitary body. The question came up, whether or not it might be possible after the removal of the floor of the sella tursica, through the sphenoidal sinus, to introduce on the operating table a small tube of radium and allow it to remain there for an appropriate period in the hope that it might have a favorable influence upon the pituitary lesion. We have now under observation two cases in which this plan may be carried out. Dr. Abbe seemed to think it not an unreasonable procedure. He is holding it under advisement, and in the course of the next week or two will render his decision as to the feasibility.

Dr. G. E. de Schweinitz: My experience with radium work is a limited one and is concerned with three cases of recurrent epithelioma or rodent ulcer of the orbit, one case of epithelioma of the eyelid, and three of vernal conjunctivitis, or spring catarrh. One of the patients, the subject of the last-named disease, was treated for me by Dr. Newcomet, and I presume is the one recorded in the lists exhibited by him. Two other patients were treated in New York at my request. In none of them was there the slightest improvement, although it is fair to state that I do not know the length of time they remained under treatment, nor the dosage, if I may so express myself, and also fair to state that those who applied the radium in New York believed that one of these patients was benefited by the treatment. Personally I could not see

any satisfactory effect. The patient with the epithelioma of the lid was rapidly cured. The growth had been excised by myself, recurred in eighteen months, and after three or four applications by Dr. Newcomet of radium disappeared entirely, so that at the present time, seven months after the treatment, it is impossible to tell that a growth had ever existed upon the lid. Preceding this happy result, however, there was the most alarming reaction: a sharp conjunctivitis, redness of the tissues surrounding the eye and of the upper part of the face, and an eversion of the lower lid which strongly suggested that an ectropion was developing. These conditions lasted for several weeks, gradually subsided, and the happy result reported now obtains. All of the patients with recurrent epithelioma of the orbit had been submitted to the action of x-rays for a considerable period of time; radium was then tried, and, moreover, the radium treatment was in the hands of experts. No very satisfactory result was obtained, and operative interference, that is, exenteration of the orbit, was required. One of these patients, an old woman, had for a long period of time been submitted to x-ray exposures without in the least causing a subsidence of the malignant growth; exenteration of the orbit was performed, and again there was recurrence, with very severe pain. In the hope that perhaps this might be relieved, the late Dr. Shober tried the effect of radium with the result that there was the most surprising reaction, associated with a toxemia of such severity that for a couple of days the patient's life was despaired of. These toxic symptoms subsided, and with their subsidence the pain disappeared and never returned, although the patient died a few months later of exhaustion.

I mention this influence of radium because it seems to me that there is a certain use which this agent has, even if it is unable to check the progress of a growth, namely, that it alleviates pain. In other words, we may not always hope to remove the growth, but even if there is a relief of pain, the application of radium is abundantly justified. Of the value of radium in deep-seated growths I can express no opinion because I have not had any personal experience. It is fortunate that we have been able to listen to Dr. Newcomet's paper, and he is to be congratulated on the conservative attitude which he has assumed.

Dr. Jay F. Schamberg: Dr. Newcomet should be congratulated upon the encouraging results shown in the patients that he has exhibited here this evening. He should likewise be commended for his conservatism and his careful reservation with regard to pronouncement on the ultimate results of the treatment. In judging of the value of radium one should consider not only improvements or cures of certain pathological conditions, but the percentage of cures and of failures. Dr. Newcomet has exhibited cases here tonight which had failed to yield to other ap-

proved methods of treatment. There has been too much tendency in the past to exploit the use of radium in conditions that could readily have been cured by other physical and chemical agents with at least equal certainty and with perhaps less expenditure of time and money. One must trenchantly differentiate between superficial cancers of the cutaneous surface and cancers of the mucous surfaces and deep-seated cancers of the body, for they run a different course and react entirely differently to various measures of treatment. It is extremely rare for superficial cancer of the skin to go beyond being merely a local process; extension to the lymph glands is extremely uncommon, unless the contiguous mucous surfaces become involved.

These circumscribed superficial growths while pathologically malignant run practically a benign course and can be cured by a variety of destructive measures.

Radium had a distinct advantage over other methods, and particularly over the *x*-rays, by reason of the facility with which it may be introduced into cavities inaccessible to the Röntgen rays and other destructive treatments. There is, furthermore, an advantage over the *x*-ray, not only in its qualitative action, but in the constancy of dosage or irradiation, because we know the *x*-ray tube is a variable factor. The *x*-rays have an advantage over radium in that a much larger area of irradiation is obtained. I feel that we ought to maintain a feeling of hopeful expectancy with regard to the results of radium treatment. We are in an experimental period. Many cases which are improved will doubtless later relapse. The use of solutions of uranium and thorium derivatives by intravenous administration is being given trial.

The most hopeful cases Dr. Newcomet shows are those of pronounced influence upon metastatic lesions in the lymphatic channels; it has been the feeling of most men that when cancer has ceased to be a local process and has invaded the lymphatic system there is little hope of recovery.

It is fortunate that we have had presented here this evening a paper which differs in tone from the extravagant utterances which have appeared in the public press within recent weeks and months. I am quite sure that the entire medical profession regrets the undue prominence which has been given to this subject in the lay press.

Dr. M. B. Hartzell: My experience with the use of radium has been an extremely limited one. I think we must all feel that the paper read is in delightful contrast to the screaming headlines we have seen in the daily press. No doubt radium occupies a distinctly useful place in certain diseases. What its value will be in the deeper growths we do not yet know. The paper we have listened to is much in line with the report of the London Radium Institute, which states that certain things have

been done, and that conclusion will be drawn later. At the present time we have learned to look upon the superficial epitheliomata, those which occur in the skin, as rather benign; if I may use a contradictory expression, rather benign malignant growths. These can be cured in a variety of ways, but because they can be cured by radium, it does not follow that, as we have seen announced in the lay press lately, "At last a cure for cancer has been found." Dr. Newcomet is to be congratulated on his rational conservatism. Later we shall know, perhaps, why in certain cases radium gives good results and in other cases fails. In certain superficial epitheliomata the *x*-ray produces similar results and other apparently similar cases it fails utterly. We do not know why. The most we can say about radium is that it is a hopeful remedy and that when we have learned more about it, perhaps we shall discover that we have a remedy for a certain class of malignant growths. Certainly, however, the cure for cancer has not yet been found in radium.

Dr. Alfred Gordon: When Dr. Abbe came the last time before the College of Physicians, after he had exhibited the models showing some brilliant treatment of his cases, it occurred to me to ask him why should not this agent be tried in tumors of the brain which are, practically speaking, all hopeless cases. Dr. Abbe seemed somewhat surprised by this question and he said, Why should we not try? He said to me that he would make an effort to make application of radium to tumors of the brain. It would be one of the greatest acquisitions in medicine if radium could be applied to tumors of the brain. While tumors in other regions can be removed by radical surgical operations, the largest majority of tumors of the brain are absolutely hopeless cases. The literature gives instances of the successful use of radium in some neurological conditions, such as obstinate cases of sciatica. Radium has also been employed in syringomyelia and in one of the most dreadful diseases, progressive muscular atrophy. In the latter condition according to some reports it has arrested the development of the atrophy.

Dr. A. B. Hirsh: With reference to the radium emanation-bearing waters for internal administration that are extensively advertised to physicians, it should be remembered that the Department of Agriculture at Washington recently issued a caution that these waters lose their medicinal effect within a few hours after leaving the sourse of supply. This warning is the outcome of extensive investigation, of course. In view of the expensive charges being made for these waters, this fact is of sufficient importance to be given wide circulation.

Dr. John A. McGlinn: I have had absolutely no experience with radium, except one case which I sent to Dr. Newcomet. The case of the cancer of the cervix shown tonight, in which the patient was able to walk about fourteen or fifteen months after the condition was declared to be

inoperable, is probably the most remarkable of those shown. It seems to me that in these cases of inoperable cancer of the cervix, radium has its greatest field if results equal this case. In this country, in spite of the campaign waged in early diagnosis of cancer, practically all our cases come in the late stages. Until about seven years ago when Gellhorn introduced treatment by acetone we had practically no means of relief for inoperable growths. In my experience I have not seen a case present the general appearance of good health as shown in Dr. Newcomet's case after an extended period when, as a rule, the patient would have died. The *x*-ray is not available because of the impossibility of its application in this position. If radium will give further results as shown it has certainly here a valuable field.

Dr. Newcomet, closing: The discussion that this paper has brought forth more than pleases me, especially as its withdrawal had been seriously considered in the light for what has passed in the two preceding months, and had it not been for the immense amount of work done in the last few years in this direction, it would have been justifiable. In reference to Dr. de Schweinitz's observation upon Spring catarrh, it will be noticed in the list of cases to agree with his observation; however, Sir MacKensey Davisson has reported a number of cases of Spring catarrh that have been permanently cured. The case here reported is the only one, and no doubt was not treated in the best possible way, the radium having been applied through the lids when it should have been done with the lids everted, and direct application made. With reference to direct applications to the brain referred to by Dr. Frazier, it seems hardly necessary to open the head to make these applications with the radium as the "cross-fire" should answer and give as perfect a result. The one presented tonight gives an example of this method, and, while decidedly improved, hasty conclusions must be withheld, it was merely presented as a case, and is exactly as you see it. For the boy's sake, it may be hoped that the improvement was due to the radium; but it must be admitted that sarcomas are always most irregular in their course, and glioma is of sarcoma type. The cases of spontaneous cure have usually been sarcoma, and often they develop to a certain point, then stop or undergo a retrograde metamorphosis. I remember a case, some years ago, operated upon by Dr. Deaver and sent home to die, but in which the patient became perfectly well without any treatment whatsoever. In these cases epithelioma of the lip with tremendous cervical involvement, in which the local condition only was treated, and followed by the disappearance of the growth and the cervical glands is something which at present I cannot explain.

The matter of dosage and reaction is hard to explain in the individual case, a small amount of radiation may be needed in one instance while another may demand more, depending upon the idiosyncrasy of the

individual, and some judgment must be used accordingly. In the case referred to by Dr. de Schweinitz, where the reaction was terrific the one idea was the healing of that epithelioma, although the reaction was excessive, the patient was previously warned that no doubt he could expect it; however, the patient is now perfectly well. In superficial growths radium has remarkable effects, but it must be remembered that they respond to many other forms of treatment. A physician, for instance, had a troublesome recurrent wart and asked to have it radiated. I applied 2 mg. of radium for a couple of hours. A few days later a letter was received from him saying that the next day, while in washing his hands the wart had dropped off. This must not be regarded as a wonder, for you have all heard of warts disappearing from "rubbing potato" on them. Well, some people may use potato, and others may use radium—and there you are.

To answer Dr. Gordon's question, in regard to the treatment of syringomyelia, there have been several reports upon this subject and also the relief from pain in tabes and other forms of spinal degeneration. Claims are made for the use of radium in almost every disease in the book; even acute pneumonia has been treated. The ultimate results in diseases of this class treated with radium cannot be given at this time, and not until a long list of cases have been treated will they be of any value toward that end.

The ideal method of employing radioactivity is to use the emanations of radium. From emanation comes the "active product of rapid decay," which is responsible for the activity radium. Where you have a large supply of radium you may take off the emanation and use it, keeping the radium in stock, where it is perfectly safe. This method has been employed by the London Radium Institute and supplies "the activity of the radium" to outside physicians. Emanation waters must be used soon after derivation from their source, otherwise they lose their activity. The time for the disintegration being about one month, with one-half in four days, and from this must be calculated the time the water seeps through the ground to the surface.

THE CURE AT VITTEL[1]

By WILLIAM J. TAYLOR, M.D.

ATTENDING SURGEON TO THE ORTHOPEDIC HOSPITAL AND INFIRMARY FOR NERVOUS DISEASES AND TO ST. AGNES' HOSPITAL; CONSULTING SURGEON TO THE WEST PHILADELPHIA HOSPITAL FOR WOMEN AND TO THE WOMAN'S HOSPITAL, PHILADELPHIA

I HESITATE very much to read a paper descriptive of a Water Cure before the College, and my only excuse is the fact that until a few months ago I personally knew nothing of Vittel and its waters, and have been unable to find a single fellow who has any definite knowledge of the methods of their administration or of the extent to which they are resorted to by the people of France and the continent of Europe generally. I have derived personally such benefit from the cure, and have learned so much during my stay at Vittel that I hope what I have to say may at least prove of some interest.

Vittel is in northeastern France, in the Vosges, in a wide valley with an elevation of eleven hundred feet, and surrounded by a charming and well cultivated country. It is about three and a half miles from Contrexeville, and not very far from Martigny.

While there are numerous springs only two are utilized, the Grande Source and the Source Salee. These waters may be classed as mild alkaline bicarbonated, sulphated waters, non-chloride bearing; the most pronounced characteristic being the almost total absence of chloride of sodium. Their mineralization is sufficient but not excessive, and they have not the inconvenience of waters highly charged with sulphate of lime, which is of doubtful value and difficult of digestion, nor the dangers of waters

[1] Read February 4, 1914.

too strongly alkaline. The really active principles of the waters of Contrexeville, Martigny, and Vittel are the sulphates, carbonates and chlorides of magnesia, soda, and potash, and to some extent the bicarbonates, while the objectionable element in all is the sulphate of lime. For this reason the waters of Vittel, which contain less than one-third the amount of sulphate of lime than both Contrexeville and Martigny, are superior to either of them. They are readily absorbed and have not the tendency to liberate free carbonic acid, and can be used with great freedom as a table water. The absence of sodium chloride renders them of the greatest value in all kidney troubles, in arterial degeneration, as well as many diseases of the heart, and in all neurasthenias consequent upon toxemias of every sort.

The Vittel treatment is primarily that by diuresis. The average length of a cure is three weeks.

The waters when taken on an empty stomach pass quickly onward into the intestines, and absorption and subsequent elimination by the kidneys is very rapid. The quantity of urine passed is enormously increased and the blood is thoroughly cleaned and its viscosity greatly diminished.

The doses of the waters required vary much in different individuals and diseases, and are always carefully, and in some cases minutely, graduated. In some conditions the water is administered in an empty stomach, in others a little before meal times and the dose for the day is broken up, and the interval between the drinking of each fraction carefully prescribed. The commencing doses are always small, and increased little by little until the system becomes accustomed to the water. Generally the patient is instructed to walk slowly the whole time between each drink. In certain cases of vascular hypertension, movable kidney, and in certain other conditions, this is not permitted and the best results are obtained if the water is taken while the patient is in bed.

The waters must always be taken under the direction of a physician, of whom there are sixteen at the Springs.

A careful history is first taken, and the weight, height, blood

pressure, and capillary reaction noted; and a twenty-four hour specimen of urine is examined with the minutest care both chemically and microscopically.

It will give a better idea of the cure if I describe my daily routine, which is that of the average patient who is gouty and with a tendency to renal calculi, and whose elimination is insufficient.

I was called at 6 A.M., and dressed leisurely and got down to the spring at 6.40. For the first three days a half glass of Grande Source water was drunk every twenty minutes until three doses were taken. This amount was gradually increased until I was drinking six full quarter-liter glasses of the water, one glass every fifteen minutes. During this time I was urged to keep on my feet, and to walk slowly up and down the esplanade and about the grounds, but not to walk rapidly enough to produce sweating. In this way I generally covered about three miles during the morning, some times more.

Every other morning, at 8.30, I was given massage under water. This is practiced at Aix and at Vichy, and I presume at other Cures. Some people are given this only twice a week and on the other days hard, dry massage, with violent exercises. Massage of some sort is considered essential while taking the cure, as it stimulates all of the tissues to greater activity and aids materially in elimination. After the massage under water, which is simply massage and movements of all of the joints while a spray of hot water from the Grande Source is playing over the whole body, a douche is given, at first very hot and gradually becoming colder. You are then wrapped in a warmed linen gown, surrounded with blankets and laid to rest in a side room for fifteen or twenty minutes. This does not produce much sweating, in fact almost none. You are then rubbed down with a fibre glove and a fiery mixture which looks like cream but feels like tabasco sauce, and you are then as red as a lobster and feel wonderfully stimulated. This is not oleaginous, and you can immediately put on your clothing without soiling them in the least.

All this takes about an hour, and one is then quite ready for breakfast of toast and coffee. It is essential that no food whatever be taken until a full hour has elapsed after the last dose of water has been drunk.

Now comes a period of well earned rest, occasionally as a nap, but generally spent in an easy chair with books and daily papers.

Luncheon was at 1 P.M., the usual French breakfast with a fork, and consisted of eggs, cereal, vegetables, some light meat, and cheese. After further rest, beginning at 3.30 P.M., three more glasses of water were drunk, one every fifteen minutes, again walking and listening to the music of a very excellent band. After this a brisk walk was usually taken for several miles about the country or through some charming woods which are near.

Generally at 5 P.M., tea and toast were taken, and dinner at 8 P.M. For all Americans and English this afternoon tea is of real value, for the diet generally is light in character and after so much exercise, if this is not taken, one is too hungry for dinner and the tendency is to over eat at that meal.

All this seems a very simple and monotonous life, as indeed it was, but you are doing only that which every other person is doing, and the days pass very quickly.

For those who are energetic there are fine golf links, and good tennis courts, as well as fencing and other amusements in the casino; while at the height of the season there are horse races aeroplane flying, and in the evening a good theatre and moving picture shows.

The water of the Grande Source is particularly useful in all troubles arising from uric acid and its allies, such as gout, the gouty state, gravel, arthritis, certain albuminurias, nephritis, cystitis, prostatitis, some of the eczemas, neuritis, neurasthenias of toxic origin, colitis, and certain dyspepsias.

The water of the Source Salee is richer in magnesium salts, and is particularly useful in liver troubles, malaria, Malta fever, alcoholic excesses, and over eating. By relieving the catarrh and the congestion of the bile ducts it is of value in cases of biliary calculi. Certain forms of diabetes of hepatic or pancreatic origin

are said to be much improved by its use, and the claim is also made that great improvement follows its use in cases of chronic bronchitis.

Dr. Johnston-Lavis, the one English physician at Vittel, to whom I was directed and who prescribed my treatment, showed me the greatest courtesy and kindness. He told me that in certain juvenile epilepsies, particularly in those with digestive disturbance and faulty elimination, the use of the waters was of the greatest value in diminishing the number of seizures and in a few cases seemed to be of lasting benefit.

My own experience in the use of these waters would lead me to believe their greatest efficacy is in cases of excessive uric acid and other waste products or toxemias and renal calculosis.

Its action in lowering blood pressure is most marked by diminishing the viscosity of the blood. In the first stage of arteriosclerosis, in which the arteries are kept in a state of spasmodic contraction and consequent high tension from the circulation within them of blood loaded with toxins, the results are very pronounced. My own blood pressure was lowered ten points in the course of a week, although at no time was it high. Its action upon the high blood pressure of several people whom I met there was very striking.

A carefully selected diet list is given to you, and must be adhered to closely. This consists of a reasonable amount of meat, not to exceed five ounces per day, but beef and mutton were given not oftener than twice a week; poultry of all sorts but the greasy kinds such as goose and ducks, in very limited quantities; game occasionally if fresh; fish, except coarse kinds. While eggs, milk, cream, fresh butter, healthy cheeses, junket and soured milk were freely permitted. Vegetables of all sorts, except rhubarb, spinach, French beans and strawberries; while ripe grapes, apples, pears, and oranges were allowed. Bread and toast only in limited quantities. Coffee once a day, and tea once a day. No alcohol was permitted, but at times patients are allowed to take a small quantity of dry light white wine, or one and a half ounces of Scotch whisky well diluted.

All heavy gravies, strong meat soups, potted and preserved

meats and fish, and highly seasoned dishes were prohibited. High game, rotten cheeses, rich and greasy pastry, much sweets, chocolates, hot condiments, and cocoa were not allowed, and malt liquors never permitted.

At all of the hotels, which are very comfortable and well-kept, two bills of fare are provided, one that of the Regime, which is under supervision of the physicians practicing at Vittel, from which your own special diet can be selected (all articles in this list contain very little salt); and the other for persons not taking the cure. One can easily get to the point where boiled eggs can be eaten and enjoyed without salt. The diet is quite a liberal one, but is so arranged that the amounts of the various articles are small and one under-feeds rather than over-feeds. The waters tend to diminish the appetite, and by the end of the cure food is almost distasteful. One feels quite water logged, and I think another week would have upset my digestion completely.

The action of the waters is very rapid, as after drinking four or five glasses one's circulation feels full, the head is congested, sometimes there is slight dizziness, but in the course of a few minutes the kidneys begin to act and for two or three hours the amount of urine passed is tremendous. The bladder must be emptied every ten or fifteen minutes of absolutely colorless urine—but during the remainder of the day urination is less frequent, although the amount passed is large.

The hydropathic establishment is most complete and modern in every particular, with every known kind of bath to be administered in selected cases, while Zander apparatus of every description is provided for those who will not or cannot voluntarily walk and take reasonable exercise.

Massage and Swedish movements are given by experts, and various kinds of electrical apparatus, including a most up-to-date Röntgen Ray machine, are there for the purpose of diagnosis and treatment.

I believe that a course of the waters at Vittel for properly selected cases will more than compensate any one suffering from gout and the toxemias of the gouty state, as well as renal calculi, for the trouble and expense of the journey and treatment while

there. I am firmly convinced that this method of diuresis by drinking large quantities of this moderately mineralized sodium chloride free water, is far superior to the treatment by baths, sweating, and the drinking of actively purgative and highly mineralized waters, so frequently employed in these conditions.

While limiting the salt intake we can cut down the average daily elimination of the 12 grams of sodium chloride to about 6 grams, and thus allow the kidneys to do a lot of work which they could not otherwise perform.

One must be prepared to give up three full weeks to the cure and to attempt no active mental or physical work during the time the waters are being drunk, as the treatment is distinctly exhausting and an after-cure in some high, bracing climate is advisable before returning to the daily routine of work at home.

I believe that great good can be accomplished by taking the bottled waters here at home, but it is next to impossible for a man to expect to derive much benefit if he carries on his ordinary daily duties. It can only be of value if he will devote his whole time to it.

There is, I believe, some very distinct radioactivity in the waters as they come direct from the springs, some of which is lost when the waters are bottled and transported for long distances.

It is for these reasons that all who need this treatment should go to Vittel and take the cure, although I have been employing the waters here during the past few months with increasing good effect.

The contraindications to this method of treatment are very low blood pressure, grave valvular cardiac disease, as well as cases of profound anemias.

A physician properly introduced is treated by the management of the establishment with the greatest possible courtesy and everything will be done to make his stay at Vittel pleasant and profitable.

I was given complimentary tickets for the waters, baths, massage, the casino and the theatre, and afforded every opportunity to inspect the hydropathic establishment and to learn the details of the various methods of treatment employed.

There is the most modern and up-to-date establishment for the bottling and shipping of the waters I have ever seen. The greatest care is exercised to use new, sterilized bottles and stoppers; every procedure in the process of handling the waters and bottles is done by machinery of the most approved pattern. Over 10,000,000 bottles of the waters were shipped from the springs during the past year.

The total number of persons registered at the Bureau as having taking the cure this past summer, up to the time that I left there, was 9480.

ANALYSIS OF THE MINERAL WATERS OF VITTEL.

Grande Source (diuretic)	Grams.
Carbonic acid, free	0.0475
Carbonic acid, combined	0.3070
Bicarbonate of lime	0.2994
Bicarbonate of magnesia	0.0392
Bicarbonate of iron	0.0032
Sulphate of lime	0.6288
Sulphate of magnesia	0.1923
Sulphate of lithia	0.0004,8
Chloride of soda	0.0076
Chloride of potash	0.0004
Silicate of soda	0.0156
Phosphoric acid, Fluorin, Alum, Magnesia	Traces
Organic matters	0.0205,2
Residue at 170° C.	1.2025

Source Salee (laxative)	Grams.
Carbonic acid, free	0.0585
Carbonic acid, combined	0.4200
Carbonate of lime	0.3230
Carbonate of magnesia	0.1294
Carbonate of iron	0.0003
Sulphate of lime	1.6178
Sulphate of magnesia	0.5805
Sulphate of lithia	0.0007,9
Chloride of soda	0.0077
Chloride of potash	0.0058
Silicate of soda	0.0307
Phosphoric acid, Lithia, Alum, Manganese	Traces
Organic matters	0.0300,1
Residue at 170° C.	2.7260

DISCUSSION

Dr. William S. Newcomet: Dr. Taylor mentions the fact that possibly some of the value of these waters at the springs was due to the radioactivity that they possessed, and which during transportation was lost. This accounted for the results obtained under these circumstances. It might be mentioned that most of the water of rivers and springs are radioactive, but more especially those that come from deep wells.

Dr. H. B. Allyn: I have been much interested in the paper of Dr. Taylor. I have not had the pleasure of visiting Vittel, but I have been using the waters here for some years, having been led to try them by a lady from Paris who was visiting this city and who said that they were largely used by Paris physicians for gout. I have not, however, used them hitherto to overcome high blood pressure, but for gout, gouty conditions, neuralgias, and the general neurasthenic states accompanying gout, and for gravel I have found them the best of waters that I have used for these purposes.

Dr. James M. Anders: Dr. Taylor's paper is certainly one of interest to the internist and the general practitioner. It seems to me that his personal experience as a patient gives added value to the report which he had made to the College. Like Dr. Allyn, I have never visited the Springs, but have prescribed the waters in selected cases and found it to be an efficient diuretic. As Dr. Taylor has said, it contains no chloride of sodium. Again, the diet prescribed in the course of the treatment is a salt-free or salt-poor diet, and these two facts explain in a large measure why this water is so efficacious, both as a diuretic and eliminator of poisonous wastes. The favorable results obtained emphasize the importance, in cases of gout and other metabolic disorders, of active diuresis in their treatment. It is true that certain elements entering into the life at Vittel, described by Dr. Taylor, more particularly the restricted diet, walks, and freedom from care and responsibility, must be given weight. Again, these waters are not in the slightest degree laxative nor to any extent diaphoretic in their effect. The treatment, therefore, is based largely upon the diuretic action of the water. These results, and other similar ones, it seems to me, corroborate in a striking manner the generally accepted opinion that the kidneys are the principal eliminating channels of the body.

Dr. Taylor, closing: I have really nothing more to add than to say that Vittel is now becoming very popular, but is patronized almost entirely by French-speaking people. During my visit there of three weeks I did not see half a dozen Americans or fifty English people. One heard almost every other language under the sun rather than English.

CEREBROSPINAL FLUID AND A SPECIAL METHOD OF TREATING ESSENTIAL EPILEPSY[1]

By ALFRED GORDON, M.D.

The study of cerebrospinal fluid is of interest not only to the physiologist, but also to the clinician. At bedside it becomes an indispensable element for diagnosis of various affections. Quincke, who had shown the facility with which the subarachnoid cavity can be punctured and a certain amount of fluid withdrawn, opened a new field for researches which lead in a comparatively short time to so many practical results. The characteristics of the cerebrospinal fluid from the standpoint of its various properties, *viz.*, physical, chemical, bacteriological, and cytological, can no more be ignored or overlooked, as they render in some cases most valuable aid in diagnosing various affections of the cerebrospinal axis. As a striking illustration may be mentioned the important part which the cerebrospinal fluid holds with regard to the Wassermann test. In paresis and tabes this test on the bloodserum plays a less determining rôle than on the cerebrospinal fluid. When the latter is positive, the diagnosis of a parasyphilitic disease is final. Various forms of meningitis can be diagnosed with a certain degree of accuracy from the cytology and bacteriology of the cerebrospinal fluid.

For therapeutic purposes the subarachnoid cavity with its fluid has been directly utilized in certain affections. Lumbar puncture is a therapeutic measure which has proved to be beneficial in many instances. The injection of antimeningococcus

[1] Read February 4, 1914.

serum into the spinal canal in cases of epidemic cerebrospinal meningitis has demonstrated the fact that the cerebrospinal fluid is one of the humors of the body which may contain grave toxic elements which can be neutralized by a specific antitoxin when the latter is placed in direct contact with the former. It is thus proved that this antitoxic action is carried from the spinal canal to all subarachnoid spaces and cavities of the nervous system. We are, therefore, certain that the blood serum is not the only vehicle and carrier of toxic products which develop in our economy, but the cerebrospinal fluid also participates to a considerable degree in their distribution. In view of the great accessibility of this humoral substance, it behooves us to continue its study with the view of forming a basis for therapeutic purposes.

Essential epilepsy is one of the serious affections the nature of which is still obscure and the management of which is surrounded with difficulties. We are not yet in a position to claim the possibility of complete cure. Various means devised for its treatment have not been altogether successful. The pathogenesis of the malady presupposes a constant or at least a frequent formation in the organism of the epileptic individual of unusually severe or of special toxic elements which cause the cerebral irritation to manifest itself in convulsive seizures. Such an explanation of epilepsy has its solid physiological basis besides the support of clinical observations.

It is a common observation that when the epileptic individual is surrounded with all precautions in regard to his diet and mode of living so that the formation of most noxious toxic elements is reduced to a minimum, his epileptic seizures become considerably less conspicuous in severity and frequency. Indeed, sometimes the latter may become exceedingly slight and rare.

As to the physiological reasons for a toxic basis of epilepsy, numerous chemical researches and experiments attest their *raison d'être*. In this respect the works of Ceni and Donath deserve particular mention. Ceni has worked at this subject since 1901. A resumé of his conclusions is clearly presented by him in *Central-*

blatt für Nervenheilkunde, 1905, xxviii, p. 213. His investigations concern exclusively the chemical constituents of blood serum in epileptics. He believes that there exists an active specific substance which by itself or when united with other material brings into display an epileptogenetic substance, hence cerebral irritation and convulsive seizures.

J. Donath (Hoppe-Seyler's *Zeitschrift für Physiologie Chemie,* 1903, xxxix, 526) has devoted special attention to the study of cholin in the cerebrospinal fluid of epileptics. He found it almost invariably present in every case of epilepsy. He concludes from a large series of experiments on animals carried out by himself and others, that cholin plays a most conspicuous rôle in the explosion of epileptic attacks as a result either of hyperemic or inflammatory or else hypoplastic state of the cerebral cortex. He went further and investigated the origin of epileptic fits occurring in the course of other diseases, especially in paresis. Here again he arrives at the conclusion that cholin takes the predominant part among other morbid elements in the outbursts of epileptic seizures. He, however, does not deny that ammonia and keratinin may participate in the causation of the disease.

The researches of these two authoritative observers are sufficient to prove the contention that a highly toxic state of bodily humors is intimately associated with the onset of epileptic convulsions. Ceni long ago observed in the course of his studies on epilepsy that the blood serum of one epileptic injected into the blood of another gives sometimes satisfactory therapeutic results. He therefore concluded that the serum of one has a specific action on the serum of another. He also observed that the serum taken from one epileptic individual produced favorable results when injected into the blood of a second patient and unfavorable results when injected into the blood of a third patient. The situation is therefore analogous to the effects of antisera in other diseases. Ceni's studies in that direction have so far given no positive results, as he has not been able as yet to determine exactly the characteristics of the blood serum which fit each individual case. The difficulty in my judgment lies

perhaps in the complexity of the contents of the blood and of the great variety of reactions of its constituent elements to various extraneous agents.

The cerebrospinal fluid does not present the complexity of the blood. It presents a medium which is easily accessible. It participates in infectious and toxic processes occurring in the organism. The above-mentioned studies of Donath, also the investigations of other writers, such as Dide and Saquepee, Pelligrini, Jahns, Castaigne, and others show the existence of a marked toxicity of the cerebrospinal fluid in epilepsy. In the course of my investigations of which I am about to speak, the presence in the cerebrospinal fluid of some noxious elements was evident. When a lumbar puncture was performed on one of my patients (Case I), some blood was noticed in the tube with the first quantity of the withdrawn cerebrospinal fluid. The fluid was preserved and an interesting phenomenon was observed, *viz.*, complete hemolysis. The tube has been kept for several weeks and at no time coagulation or a sediment of blood could be seen. To all appearances the cerebrospinal fluid contained a poison which is destructive to blood cells. If we consider cholin as the most conspicuous toxic element in the fluid of epileptics (see Donath's work), the hemolytic phenomenon is thus explained. Pursuing further my studies, I observed that when this particular patient kept on improving and his seizures became very mild and rare (see below), this phenomenon disappeared.

The most interesting observation is the following. One drop of blood drawn from the finger of one patient is dropped in the centre of the surface of 15 drops of cerebrospinal fluid taken from another patient, and *vice versa,* a drop of blood of the second patient is brought into contact with 15 drops of cerebrospinal fluid from the first patient. Also the blood of each patient was brought into contact with their own cerebrospinal fluids. In the first place complete hemolysis took place, while in the second case the blood remained coagulated at the bottom of the tube for days. It was evident that in these cases the cerebrospinal fluid of each patient contained poisonous elements which were antago-

nistic to each other's blood, but not to their own. Otherwise speaking, each cerebrospinal fluid contained substances which acted specifically on another epileptic but not on the same.

Parting from this principle, I asked myself, if it could not be utilized in treatment of epilepsy. Accordingly I selected at first two grave cases of epilepsy, in which the ordinary treatment was of no avail. I withdrew from each 30 c.c. of cerebrospinal fluid and immediately injected subcutaneously 3 c.c. into each other's arm. Headache followed at the end of each withdrawal of fluid, but it disappeared in twenty-four and forty-eight hours. The patients were watched closely; the bromides were continued as usual. During the following three days until the second injection, no attack occurred. During the following two weeks the patients had four injections and not a single attack occurred. On the third week the supply of the cerebrospinal fluid became exhausted. The patients began to show recurrences. The latter, however, were incomparably milder and different in character than the original ones. They were of *petit mal nature.* The histories of the cases detailed below show that even the early results were striking. The subsequent course of the disease, the intervals between the recurrences, the nature of the latter, the freedom from attacks for weeks, the improvement in the mentality and the general health of the patient, finally the discontinuance of bromides all tend to show that the results from this new method of treatment are very promising. Encouraged by the first two cases I applied the same treatment to three other cases. The last one, a little girl, presented certain features that left no doubt in the efficacy of the method. In her case no lumbar puncture was performed so that withdrawal of fluid could not be considered as the cause of her remarkable improvement. It is well known that some favorable results have been obtained in epilepsy from repeated lumbar punctures. In my patient the improvement in all probability was due to the subcutaneous injections of the cerebrospinal fluid.

The highly satisfactory results which the new method gave me prompted me to bring it to the attention of the profession so

that others may apply it to those cases which they have been unable to relieve and which they have decided to abandon because of their incurability. My communication is only a preliminary one. I have only four cases to report which have been studied for a period of ten months. Further attempts on a larger scale are necessary before final conclusions could be drawn. The histories of these cases are as follows:

Case I.—Young man, aged twenty-five years. Suffers from typical epileptic seizures for the last six years. During the last year the attacks became very frequent; he would have them four or five times a week and several times in the same day. They were all of *grand mal* type. Patient had the usual treatment with bromides prior to my attendance with no result. During a period of four months I had him on bromides in combination with antipyrine, also subjected him to a very strict diet appropriate in such cases. He had periods of improvement, but the latter was only slight. As lumbar puncture has been advocated in essential epilepsy, the patient was submitted to this method. Three punctures were made at three-week intervals, but no benefit was noticeable.

The new treatment was then begun ten months ago. Up to the time of writing these notes the patient had 8 lumbar punctures, 30 c.c. of cerebrospinal fluid were withdrawn each time. Part of the fluid was put aside for laboratory examinations, the remainder served for intramuscular injections into other patients. The first injection from Patient II was made with 3 c.c. No local unpleasant effect was observed. The bromides were continued as before this treatment and no change had been made with reference to the general rules, to diet, etc. During the following two weeks he had four injections each at 3 c.c., and the following three weeks the patient's mother noticed that not only were they decidedly less severe, but the post-epileptic mental hebetude was unusually brief in duration. Besides, only one fit occurred the first and two each subsequent week. The injections were resumed and 5 c.c. were administered. As disappearance of the attacks again took place, and no untoward manifestations were observed, the dose of 5 c.c. was decided upon for further treatment. Twice a week he received the injection. The quantity of bromides was decreased and in two weeks was removed completely, but the dietetic and hygienic rules still followed up. In all the patient, had five injections of 5 c.c. each. During the three weeks of treatment he had but one attack which consisted no more of the clonic and tonic convulsions, but of a sudden loss of consciousness with a tendency to

run. This attack lasted but a few seconds. At no time prior to this treatment did he have a similar attack. As the supply of cerebrospinal fluid became insufficient and no injections could be made for the following three weeks, the patient decided to stay away. When he returned, he told me that he took no bromides and only one attack occurred during that time. The latter was exceedingly brief and consisted of a momentary loss of consciousness. The injections were resumed and administered twice a week for the following two months. Small doses of bromides were given the patient one or two days of each week. The patient had, during this time, only three attacks of *petit mal* character as described above. An interval of three weeks followed during which no injection was administered and no bromides given. No attack of any form occurred. Again the injections were resumed and are being continued to the present time. Bromides are given very exceptionally, and only when his sleep is occasionally disturbed.

It is interesting to note that during the last six months not one major attack occurred, that they were replaced by seizures of *petit mal* character, that the latter are rare, and that the general health has improved remarkably. As a last interesting point may be mentioned that bromides have been taken by the patient in but very small quantities, and only very occasionally. The patient is still under observation.

Case II.—Young man, aged twenty-eight years, huckster by occupation, has been suffering from essential epilepsy for twelve years. The attacks are of *grand mal* character and very severe. They occurred at first every two months, but for the last four years two or three times every week. Before coming under my care he had the usual course of treatment with bromides. The result was negative. About ten months ago simultaneously with the first case I commenced the injections of cerebrospinal fluid. The latter was taken from the first patient. The method and quantity administered were identical with those of the first case. The results were practically the same as in the first case with this exception, that the intervals free from attacks and during which no injections were made, were on several occasions greater than in the first case; also, when an attack occurred, it was, while of *petit mal* nature, but of a different character than in the first case, *viz.*, the patient would suddenly talk confusedly for a fraction of a minute. No major attacks occurred within the last five months. The *petit mal* fits still occur but on very rare occasions. The patient's mentality and general health have improved considerably.

Case III.—Man, aged thirty-nine years, tailor by occupation, has had epileptic fits of *grand mal* character since the age of seventeen years. In the last five years they were quite frequent, they occurred four or

five times a week and sometimes several days in succession. For a number of years he was under bromides, but with the usual result, *viz.*, at times amelioration, at others without the least effect.

The injections with cerebrospinal fluid commenced about nine months ago. The fluid was taken from the first patient. The method pursued was exactly the same as in the other patients. The result was more striking than in the other two cases inasmuch that on one occasion there was no attack of any kind during a period of five weeks when even no bromides were given. Considering the great frequency of the major fits before the treatment, *viz.*, four or five times weekly, their disappearance for five whole weeks was exceedingly gratifying and suggestive. The cessation of attacks occurred after the third injection. Whenever the supply of fluid became exhausted and the treatment had to be interrupted, recurrences took place, but, contrary to the other two cases, they were of major character. However, they proved to be considerably less severe and of shorter duration; they consisted only of unconsciousness and tonic contractions of the extremities. The attack was very brief; the patient did not present any marked mental hebetude, and did not go to sleep after the fit. At no time were there attacks of *petit mal* nature.

The recurrent seizures disappeared every time the treatment was resumed. Nevertheless, on two occasions the patient continued to have them while the injections were being made, but only once a week. Again they were comparatively very mild and very brief. Bromides have been given only during the weeks of recurrences and in small quantities. The patient is still under observation, and his condition at the time of writing these notes is most satisfactory; no attacks occurred for the last three weeks.

Case IV.—Little girl, aged eleven years, has had epileptic attacks since the age of four years. At first only occasionally, they became very frequent within the last eighteen months. She could not acquire any knowledge, as the spells prevented her from studying. She was therefore arrested in her development. Like the other patients, she had energetic bromide treatment with little or no result.

She was submitted to the new treatment eight months ago. The following peculiarities must be mentioned with reference to this case. No lumbar puncture was performed during the entire treatment, and the cerebrospinal fluid from the third patient was used all the time except on two occasions which will be mentioned later. The patient began to show decided improvement after the first injection. The nocturnal seizures ceased completely and the day attacks diminished at once; instead of the former daily fits she now had only two a week. After the

fourth injection they disappeared totally for a period of three weeks. When the patient whose cerebrospinal fluid she received showed marked improvement, she began to have recurrences, though slight. I have then conceived the thought to inject the fluid from the first patient at the time he showed recurrent attacks. At once improvement was obtained. I then returned to my third patient and managed to puncture his spine at the time he showed recurrences. This fluid was used for the little girl again, and improvement was also observed. On another occasion I was obliged to have recourse to the same change of the individual's fluid because of the refusal of the third patient to permit a lumbar puncture at the time I was in need of it.

In view of the above peculiarity I always managed to use the fluid at the time of recurrent attacks, no matter how mild they were. Moreover, because of this casual observation on the fourth patient I decided to apply the same principle to the other patients. I found that the same observation was identical in the other cases. All of them showed more lasting and prompt improvement when the cerebrospinal fluid drawn at the time of recurrent attacks was injected. The fourth patient, like the others, had recurrences, but they were mostly like in the first two cases, *viz.*, of *petit mal* nature. Only during one month she had two attacks of the major character. The latter were decidedly milder than they have ever been, so that, according to the child's parents, the attacks would have passed unnoticed were it not for a slight noise which the patient makes during a seizure. Presently she is free from attacks of any nature and has been so for the last six weeks. She receives an injection of 5 c.c. once in a week. No bromides have been taken by her for the last two months.

The four patients treated with subcutaneous injections of cerebrospinal fluid taken for each from another epileptic benefited considerably. The direct effect of this procedure was and is unmistakable and for the reason that prior to this treatment for months and years the patients received uninterruptedly large doses of bromides and other drugs, and there was comparatively speaking, very little or no relief at all. The improvement after the administration of the cerebrospinal fluid was strikingly noticeable not only with reference to the severity of the individual attacks, but also to their frequency. The intervals between the seizures were remarkably long considering their occurrence before the new treatment was instigated. Moreover, in some of my

cases the nature of the fits changed; *petit mal* took the place of the *grand mal.* The mental hebetude following epileptic seizures became here exceedingly slight. The treatment, shortly speaking, proved to be highly beneficial.

An objection may be raised to too much reliance on the effect of the fluid on the epilepsy, as spinal punctures with extraction of some of the cerebrospinal fluid have been reported as having a beneficial effect in epilepsy. This objection may be removed, I believe, by the fact that while in the three male patients the spines were punctured, the girl patient had no spinal puncture—and the results were just as satisfactory. While it cannot be totally denied that the lumbar punctures may have had something to do with the amelioration of the epilepsy, nevertheless the similarity of the results in the case without lumbar puncture with the results of the cases with lumbar puncture—renders the above objection almost untenable. This similarity was observed in every detail such as in the promptness of the improvement after one or two injections, in the duration of the intervals between the attacks, in the slightness of the recurrences, in the greatest amount of improvement noticeable especially if the fluid injected was taken from the patients during recurrent attacks, no matter how slight the latter may have been.

Another objection may be brought forward, namely, that improvement has been observed in cases of epilepsy treated with the ordinary medications and even without medications. This assertion cannot be denied, as in the experience of every neurologist such cases have occurred. However, in the four cases reported here such an occurrence was not observed. Every one of the patients presented the most serious type of essential epilepsy with no abatement of the intensity and frequency of the seizures, in spite of the uninterrupted treatment with the classical remedies carried out by experienced men. The improvement in all the four cases was striking, shortly after the new treatment was instituted. To all appearances the results obtained were due to the favorable effect of the cerebrospinal fluid of one epileptic individual on the seizures of another epileptic individual.

The number of cases thus treated is certainly very small to permit us to draw incontrovertible conclusions. It must be distinctly understood that no final claim is or can be made as to the curability of epilepsy by this method. The above mentioned objections, namely, that other factors may have played a certain rôle in the striking amelioration of my patients, have their *raison d'être*. Besides, the duration of my observations, *viz.*, ten months, is too brief for final deductions.

This communication is only a preliminary one. It is brought forward with the object of calling the attention of others to a field of work yet unexplored. Epilepsy is one of the grave affections for which our therapeutic efforts have accomplished little. The results obtained in my cases have been uniformly so satisfactory that I feel warranted in bringing the method devised for treatment of such cases to the attention of those who are in a position to continue further investigation of the procedure.

The problems which confront us in this line of investigation are in my opinion as follows.

1. Determine whether each epileptic individual requires the cerebrospinal fluid from one certain individual whose fluid possesses certain well-defined properties.

2. Determine whether the fluid taken promiscuously from any epileptic individual is sufficient.

3. Determine whether preliminary spinal puncture is absolutely necessary before the treatment is instituted.

4. Determine what particular element or elements in the cerebrospinal fluid play the most important part in controlling the epileptic seizures.

5. Determine in what way the toxic elements of one epileptic are capable to counteract the toxic elements of another epileptic and thus remove cerebral irritation.

These are the few most important features of the problem of treatment of epilepsy as viewed from the standpoint of the method offered in this preliminary paper. It is my belief that the combined efforts of experimental and clinical investigations may solve the difficult question of therapy of epilepsy.

DISCUSSION

Dr. Morris J. Lewis: Dr. Gordon's paper is interesting. He does not mention whether in any of the cases the Wassermann reaction was present or not. I have had a large experience in epilepsy at the Orthopædic Hospital and Infirmary, and have found that quite a large proportion of the cases show the Wassermann reaction. Especially is this true of cases developing after puberty. I would hesitate about using spinal fluid, in the manner mentioned, in any case, and especially without knowing most definitely that there was no communicable disease. The possibility of luetic infection alone shows the unwisdom of this procedure.

Dr. Gordon, closing: There is no question but that hesitation should be felt in any new treatment. I did not introduce the fluid into the spinal canal, but subcutaneously. I simply take this opportunity to present to the profession the favorable results so far obtained. It is for others to prove whether or not the procedure is worth while. There is no treatment, to my knowledge, which has given more satisfactory results than this particular one. The Wassermann test was made and found negative. The paper is simply a presentation of a few facts occurring in my personal experience.

THE INCIDENCE OF FIBRINOUS AND BRONCHO-CATARRHAL PNEUMONIA IN THE PHILADELPHIA GENERAL HOSPITAL[1]

By ROBERT N. WILLSON, M.D.

Considerable interest and an occasional good natured difference of opinion have existed during the past eighteen months, as the result of the determination of one of the medical services in the Philadelphia General Hospital to discriminate sharply between the fibrinous and the bronchocatarrhal types of pneumonia, especially with a view to treating patients suffering from the one condition in cold, and from the other in warm, fresh air. During the years 1911–1913, as shown by the writer in a previous paper (*Journal of the American Medical Association*, January 24, 1914), the mortality from all types of pneumonia on the wards was 61.5 per cent. This is a far higher figure than appears justified by the mere fact that alcoholism and privation have both entered into the experience of the patients. Rather more likely would it appear to some of us that a possible cause of this, and of a still higher death rate to which reference will be made later, has been the indiscriminate placing of all cases of pneumonia in the cold outdoor air. Fibrinous, or bronchocatarrhal pneumonias, in patients old or young, with febrile or subnormal temperatures, strong or weak, have all been started toward the open air bridges, almost on the run, once the diagnosis of some form of pneumonia has been determined. All, including the writer, have participated in what, on second thought may appear to have been an ill advised procedure. Only within the past year has there been apparent

[1] Read March 4, 1914.

the slightest tendency to retrace the steps from the cold bridge to the warm ward with patients that not only fail to do well, but suffer manifest harm from the low temperature exposure.

THE DIAGNOSIS

It will be important at the start to make clear the features which have guided us in the determination of the type of pneumonia in our own cases. In bronchocatarrhal pneumonia we have regarded as first and most important the previous and present state of the patient, usually one of distinct asthenia, often with cardiac dilatation, always with a definite initial bronchitis. Not infrequently is the pneumonic lesion simply an extension process in the course of a bronchiolitis forming part of such a primary condition as influenza, measles, tuberculosis, typhoid fever, smallpox, or food toxemia. The heart muscle in these cases is practically always in distress. Here and there in favorite areas over the lung may be found small foci, exhibiting crackling (subcrepitant) rales, tubular breath sounds, and an impaired percussion note. The most frequent of these chosen sites is perhaps the anterior axillary line on the right, often the left side. Next and most common, are the subscapular areas; and last of all, either the pulmonary bases, or the apices. Often the process is central, and the physical signs are obscure. Not infrequently, on the other hand, especially if the case is seen late, an entire lung will show massive consolidation from fusion of many peribronchiolar foci. Tubular breathing may be intense and audible over this entire area.

In addition the temperature almost invariably runs an irregular, usually low grade, sometimes altogether subnormal course. The pulse-rate is high and also characteristically irregular; the impulse is small and mean. The respiratory curve is irregular, but follows no rule. It tends rather to be low than high in rate. The fall of all three, temperature, pulse, and respiratory rates is usually by lysis. Occasionally the pneumonic process will resolve in a day or two and end by crisis. The autopsy, if one is reached,

will not always show macroscopically the typical peribronchiolar foci of consolidation, providing these have entered upon a stage of extensive coalescence. The microscope, will, however, at once betray the inflammatory involvement and thickening of the bronchiolar walls, the minimal quantity of fibrin, and the great proportion of epithelial material in both the bronchiolar and vesicular exudate. True fibrinous (croupous) pneumonia needs hardly any description, as it constitutes the old book type of the disease. Only its increasing rarity gives it a special interest. The patient is, as a rule, of a very different type from that just described. He or she is usually of a more or less robust build and of good previous health. Oftentimes he has experienced a better physical condition, just prior to the attack, than for a long period. The onset is sudden, is often attended by vomiting, the temperature is high, and remains so fairly constantly throughout the disease. The course is well defined, and usually ends by crisis in seven or nine days. As a rule an entire lobe is involved, running through the stages of congestion, red hepatization, gray hepatization, and resolution, with characteristic physical signs. The right lower lobe is most often involved, not seldom the left lower lobe, and less often the apices. If the case comes to autopsy there will be seen the typical lobar involvement in either the stage of red or gray hepatization. Fibrin plugs may stand out from the alveolar spaces in characteristic fashion. The microscopic examination of a section of lung tissue will show an entire lack of a bronchiolar or peribronchiolar origin of the disease, only a minimal proportion of epithelial elements will be present in the exudate, while in their place everywhere are noted fibrin and even organized tissue in the large and small air spaces.

1911–1913 INCLUSIVE

During the three years 1911–1913 there came under treatment in the Philadelphia General Hospital, 615[1] cases of pneumonia

[1] In previously published figures the 19 cases discharged in December, 1913, were not included.

of one or the other type. These cases were distributed throughout the various medical services, and experienced varying forms of routine medicinal treatment. Practically every case was treated outdoors, in the cold, whether the patient's temperature was febrile or subnormal throughout, whether or not the patient was cyanotic and in evident respiratory and cardiac distress, or whether the case was a distinctly sthenic one and the heart and vasomotor system were in satisfactory condition. Whether *post hoc* or *propter hoc* the mortality of this regime totalled 61.5 per cent.

I have records of 61 cases treated on our own service during this period, practically all in the cold, open air, of which 36 died and 25 recovered, a mortality percentage of 61 per cent.

January 1 to February 28, 1914

During the months of January and February, 1914, there were treated on our own medical service 19 cases of pneumonia comprising by an interesting coincidence, a total of nearly one-half as many cases as were handled by all the other services combined. Of the 19 cases, the entire number with one exception, ran a course typical of bronchocatarrhal pneumonia. All were treated in as fresh air as possible, upon the warm general wards, since a special ward was unobtainable owing to general overcrowding of the institution. Sufficient bedclothing was supplied to the patient to enable him to conserve his heat and energy supply. Sixteen of the number recovered, and 3 died. Two of the latter were nearly moribund on admission, and died shortly thereafter. Another was a negro with an extensive cardiac lesion, probably syphilitic in origin. This patient, a confirmed alcoholic, developed a large pleural effusion, which was removed by aspiration. When seemingly on the road to recovery he suddenly died, probably from pulmonary embolus. No autopsy could be obtained. The mortality in this small but characteristic series was 15.2 per cent.

Practically all of the patients had been addicted to some use of alcohol. The single case of fibrinous pneumonia died within a

few hours of admission, and the autopsy showed extensive gray hepatization of the right upper lobe.

During December, January, and February, 1914, our single service treated in the warm air 25 cases, of which 4 died, giving a mortality of 16 per cent.

CONCLUSIONS

It would seem as though one were compelled for sheer conscience sake to examine both his own experience and that of others as to our warrant for believing that the preponderating type of pneumonia, both in the Philadelphia Hospital and out of it is one originating in a bronchiolar and then a peribronchiolar process. This is important from the standpoint of treatment and prognosis. I personally doubt whether there ever has been or ever will be seen a truly sthenic, vitally vigorous sufferer from bronchocatarrhal pneumonia. The very origin of the disease presupposes a bronchitis, in a patient with a lowered vitality. It seems, therefore, obligatory that we face and answer the question "have we really been killing many of our bronchocatarrhal pneumonia patients by treating them as though they were of a sthenic, febrile type?" And again, with all the effectual modern applicances at our command for the supply of warm, clean air; with the opportunity of washing and rewashing and then resupplying an already used and heated air that has actually been proven cleaner and richer in oxygen for the heart and lungs of the patient than an unwashed outside air; is it not our duty, I ask, to lay hold upon these appliances and conveniences and employ them not only for the benefit of school children and threatre goers, but with a view to saving the lives of the sick, and especially of sufferers from the type of toxemia which we call bronchocatarrhal pneumonia.

We stand aghast at such mortality percentages as 61.5 and 51, even in a pneumonia community largely drawn from alcoholic subjects. What is possible in the premises, and what do we aim to accomplish? I reply, first insist upon a clear cut discrimination between the two clinical types of pneumonia. Let us forget a little

while, even the name pneumococcus and the many other causative germs, active singly or in combination in both types of pneumonia, and let us remember the physical principles upon which the human vital forces are stored and expended. Let us at least keep those patients indoors who are not vitally able to establish a temperature reaction or a considerable leukocytosis as indications of their attempt to outride the storm that has beset them. Wash and warm, and even rewash their breathing air a sufficient number of times to render it cleaner and fresher than outdoor air. If modern applicances are unattainable either through a short-sighted or misguided economy on the part of those who furnish the funds that equip such a great municipal life conserver or Juggernaut, as the Philadelphia General Hospital—(and it can be made to fill either rôle)—if the necessary applicances are still unattainable, I repeat, then let us hold our asthenic pneumonia patients upon the general medical wards, and watch the percentage of recoveries rise and the mortality fall, as indicated in the small but suggestive 1914 series to which I have made passing reference. Let us send outdoors only such febrile pneumonics as crave the cold, and obtain a stimulus and a relief in and from it; let us send even these back into the warmth, when the crisis occurs, or when for any reason they are distressed by the low temperature, and appear pinched and blue from undue exposure to cold.

THREE CASES OF WIRING WITH ELECTROLYSIS FOR AORTIC ANEURYSM: ONE HERETOFORE IN PART REPORTED[1]

By H. A. HARE, M.D.

I wish to report to the College of Physicians three additional cases of wiring with electrolysis for aneurysm of the thoracic aorta and to show one of the patients who illustrates the beneficial effects of this procedure more than four years after the first operation and more than two years after his second wiring, which was resorted to because he had a return of very severe pain and a marked bulging near the site of the original sac.

The first case was a man, aged fifty-five years, who had a large pulsating growth in the upper zone of the right chest, anteriorly, which extended from the second rib in the mid-clavicular line to the fifth rib. The growth did not point in the sense that it presented, a spot which was elevated above the rest of the swelling, but in the centre there was a spot where expansile pulsation was marked and the tissues very soft and tender on palpation. His chief symptoms consisted in severe pain and dyspnea.

It will be seen that thirteen minutes after the current was turned on there is a note that the wire broke off. On examining the end of the hollow needle I found that there was a green fluid like verdigris. Fortunately, I was able to push the end of the wire, past that already in the needle, into the sac and continue the procedure starting the current again at 5 milliampères.

The record of the operation is as follows:

[1] Read March 4, 1914.

FEBRUARY 22, 1912.

1.15	P.M.	5 milliampères	
1.19	"	10 "	
1.23	"	15 "	
1.27	"	20 "	
1.28	"	Wire broke close to needle.	
1.29	"	5 milliampères	
1.32	"	10 "	
1.33	"	15 "	
1.34	"	20 "	
1.35	"	25 "	
1.36	"	30 "	
1.37	"	35 "	
1.41	"	40 "	
1.44	"	45 "	
1.49	"	50 "	(maximum amperage maintained for one minute.)
2.00	"	45 "	
2.00½	"	40 "	
2.01	"	35 "	
2.01½	"	30 "	
2.02	"	25 "	
2.02½	"	20 "	
2.03	"	15 "	
2.03½	"	10 "	
2.04	"	5 "	
2.05	"	Discontinued.	

Insertion of needle at 1.01 P.M.
Insertion of wire begun at 1.03 P.M.
Current started at 1.15 P.M. and discontinued at 2.05 P.M.
Length of operation one hour and four minutes.

As this was the second operation in which this untoward accident occurred, I investigated the matter and found that the alloy mixed with the gold was copper and that the copper had been eaten out by the current, proving that a wire made with gold and copper is an unsafe wire because it might be impossible or inadvisable to get more wire in, in most cases, and, if the break occurred after the clot formed in the needle, the further use of electricity would be impossible, although it is absolutely essential to success. At my request one of the experts of the Philadelphia Electric Company was kind enough to undertake a series of experiments to determine the changes in different kinds of gold wire and silver wire produced by electrolysis, using the same strength

of current that I employed clinically and employing normal solution to represent the tonicity of the blood. His results were as follows:

Electrolyte. Electrolyte consisted of saline solution having one teaspoonful of salt to one pint of water.

Electrodes. The positive electrode was the sample wire to be tested. The negative consisted of copper wire.

Current Used. Fifty milliampères was allowed to pass for one hour.

RESULTS OF TEST.

Sample.	Weight before.	Weight after.	Per cent. change in Weight.
Yellow gold	100.0 mg.	97.0 mg.	3 per cent. decrease
Red gold	259.1 mg.	160.0 mg.	38 " "
Silver	283.0 mg.	298.1 mg.	5 " "

The yellow gold wire was practically the same after the test as before, its physical appearance being the same.

The red gold wire became very brittle after the test and changed to a blackish color.

The silver wire took a grayish-blue deposit, and was as flexible as it was before the test.

The saline solution in each case became somewhat of a greenish color.

Chemical analysis of the solution and of the deposits on the wire was not made.

The fact that copper was used for the negative electrode may be partly the cause for the greenish color of the solution. It was unfortunate that platinum wire was not used for the negative electrode. Although this test is very rough and approximate, the results, however, give very interesting information.

This patient notwithstanding the fact that his circulatory state was somewhat excited by the performance and interruption of the operation, whereby the pressure in the sac was increased, stated when the current had passed for twenty minutes that his chest felt more comfortable and that he had less pain. Twenty-four hours later he had great hoarseness so that he could speak

only in a whisper and he developed signs of pulmonary congestion at the base of the right lung, which cleared up in forty-eight hours under the use of full doses of atropine. The hoarseness gradually decreased and when he returned home four weeks later had almost disappeared. The following letter was received from him more than three months later.

"I thought a line might not be out of place if you have time to read it. I am getting along very well. I am feeling pretty well.

"I often think of you and your kindness shown me and am very well satisfied.

"I fully appreciate all that you done for me and want to thank you again for same."

Again, July 10, 1912, he wrote:

"I am able to talk pretty well but get husky when doing very much talking."

In October, 1912, eight months after wiring, this patient came from his home in Johnstown to Altoona, hearing that I would be in the latter town, and stated, after walking about a mile up a steep grade from the station, that he had come to show how well he was. He then walked back to the station without distress. Eleven months after the operation, while walking along the railroad track in the yards of the Cambria Steel Company, he was struck and killed by a train backing down on him.

The second case is before you tonight, looking hale and hearty. He is an intelligent colored man, aged sixty-one years. He was first wired when in the service of Dr. Rhoads by my Chief of Clinic, Dr. Beardsley, November 1, 1909, four years and four months ago, for a large growth of the descending arch, pointing anteriorly, and wired a second time by me February 23, 1912, more than two years ago, since which time he has been to his home in New York State near Albany. After his first operation he worked hard, and on one occasion visited friends by walking sixty miles. This case after the first operation was reported in *The Therapeutic Gazette*, March, 1911, by Dr. Beardsley. A side from his being practically well so far as pain and dyspnea is

concerned, his case is interesting in that he is the only case in which I have employed silver wire, using silver wire because I had used all the gold wire I could obtain on the previous day on the case just reported. This man's symptoms were so urgent as to pain, dyspnea and the appearance of the aneurysm, which looked as if it was about to burst, that I felt justified in using silver wire, but I never will do so again because his survival is most remarkable. The silver wire having no spring did not coil, and, therefore, extended itself far beyond the sac, and not only entered the aneurysm, but passed not once but several times up and down the aorta as low as the diaphragm. The plate shows this better than the photograph. Why the process of coagulation which closed his sac did not also close his aorta I do not know, but some of the wire certainly went far afield from where I intended it to go. The wire was placed in the sac in 1909 by Dr. Beardsley, but the silver wire I introduced February 23, 1912. Since that time he has been up and about and in excellent condition, with little or no pain except on active exercise.

The third case presented a large aneurysm of the ascending arch. The *x*-ray report was as follows:

"Mr. B. D. has a large sacculated aneurysm involving all of the transverse arch and the latter part of the ascending arch. The apex of the sac lies in close relation with the anterior chest wall on a level with the second interspace and about the mid-clavicular line. There is a considerable space between the posterior surface of the sac and the posterior chest wall, on the right side. On the left side, however, the sac approaches more nearly the posterior wall than the anterior although it is not in close relation with either. There is no evidence of erosion of the ribs as far as I am able to determine, but the aneurysmal sac completely obscures a portion of the chest wall."

The patient suffered from agonizing pain and urgent dyspnea with incessant cough and would lie only on the left side without strangling. The record of the operation is as follows:

JULY 13, 1912.

1.07 P.M. – 1.12 "	8	milliampères
1.12 " – 1.17 "	20	"
1.17 " – 1.22 "	30	"
1.22 " – 1.27 "	40	"
1.27 " – 1.32 "	50	"
1.32 " – 1.47 "	60	"
1.47 " – 1.48 "	50	"
1.48 " – 1.49 "	40	"
1.49 " – 1.50 "	30	"
1.50 " – 1.51 "	20	"
1.51 " – 1.52 "	10	"

Insertion of needle at 12.51 P.M.
Current turned on at 1.09 P.M.
Current turned off at 1.52 P.M.

This case was in a desperate state, but within two days after operation he could lie on his back and right side with comfort. He had been unable to lie on the right side without great dysnpea and cyanosis for weeks. Cough had been excessive. Two months after operation he wrote from his home in Pittsburg that he had been out of the house only once and often had great pain in his heart and chest and all over the body and limbs. Ten months after the operation he wrote as follows:

"I am not getting very strong since the operation and have been able to do but very little work. Don't seem to get any strength in my limbs. Can only lie in one position and that is on my left side. Neither can I recline in a chair as the pressure on my back starts me to coughing. It also hurts to raise my right arm and makes me cough when I attempt it. My muscles or nerves all over my body seem to be sore. The pains in my aneurysm have not occurred very frequently, but have had several severe pains around my heart. My appetite is very good and am almost back to my normal weight. I get very short of breath from

the least little exertion or from talking. Do not rest very well at nights and do great deal of coughing in the mornings."

Since that date I have not heard from him.

In an article published by me in the *Journal of the American Medical Association*, April 13, 1912, in which I reported a number of cases of this character I reached the following conclusions:

1. The fact that no accident has occurred in any of the twenty-two (now twenty-five) operations I have performed leads me to believe that this seemingly radical operation is not a dangerous one, the more so as I have no knowledge of any accident having taken place when the operation was *properly* performed by others. In one reported case, an attempt to wire a fusion aneurysm of the carotid artery resulted almost immediately in hemiplegia, and in another unreported case the mistake of using the negative pole in the growth loosened the clots already present and caused multiple emboli.

2. The operation is the only one that offers material hope of prolonging life, this having been prolonged in one case at least five years.

3. It is justified by the prompt relief of pain which nearly always ensues and lasts, unless the growth, extending in another direction, creates a new source of pain.

4. The diagnosis of saccular aneurysm should always be confirmed by *x*-ray examination, as this operation is contraindicated in fusiform aneurysm for obvious reasons.

5. Great care that properly prepared wire is employed is absolutely necessary.

To these conclusions I would now add that after having performed this operation twenty-five times I can see no reason for changing the views then expressed, but I desire to emphasize once more the fact that only especially prepared wire can be used and that silver wire, because it does not coil, is an unsuitable agent.

It has been stated that this operation is useless because the nature of the lesion is such that cure cannot be effected. If by cure is meant the total disappearance of all signs of the disease

there is, of course, no cure, but if by "cure" we mean relief from agonizing pain, diminution in the size of the growth, clearing up of distressing pressure symptoms and prolongation of life when death seems very imminent then the operation is justified, the more so as it seems to be of little danger. The patient presented tonight had a very marked bulging mass which is described as being as large as an orange. Inspection now fails to show any such mass. I have yet to see a patient who did not get at least temporary and marked benefit from wiring and electrolysis.

This operation, like all other operations, largely depends for its success upon how it is done. If too much current is used, serious damage and necrosis of tissues may be induced, and I am led to believe that in several cases which have not been reported by others such an error in technique has led to bad results. Thus in several of these patients I am told the amount was so strong that the wire "burnt off." Such a current cooks the aneurysm. If the street current is used it is not only necessary that the table upon which the patient lies should be insulated, but that the operator wear thick rubber-soled shoes and stand on a perfectly dry floor.

DISCUSSION

Dr. George W. Norris: I should like to ask Dr. Hare whether the wire introduced into an aneurysm is ever absorbed? I have an impression, although I am not quite sure of its correctness, that in the case of a patient who died, at the Philadelphia Hospital a few years ago who had been wired by some one, no wire could be found at the autopsy.

Dr. Thomas McCrae: I wish to express my agreement with Dr. Hare's conclusions, particularly as regards the absence of danger in wiring, if properly done. Dr. Hare spoke of the curious course which the wire took in this particular patient. I have seen a specimen in which two loops of the wire passed through the aortic orifice and down to the lower end of the ventricle. The patient lived for some months and showed no signs of any disturbance from the wire. I have seen one case of anatomical cure of abdominal aneurysm after wiring. The patient died from a second aneurysm which was also wired but without the result of the

first occasion. I should like to ask Dr. Hare whether he has any theory as to why the wiring and electrolysis relieve pain? It is certainly not a question of coagulation. I recall cases in which the patients were wired and greatly relieved but died some time later, and at autopsy the wire was found exactly as it was put in and without a sign of clotting. In the patient presented, Dr. Hare and Dr. Beardsley are to be congratulated upon the functional result.

Dr. James Tyson: On March 27, 1911, I presented to the Section of Medicine of the College an aneurysm which had been twice wired in my wards at the University Hospital, wherein, too, one piece of wire had passed through the aortic orifice down into the apex of the ventricle by two loops. The first wiring, April 5, 1910, was followed by the disappearance of the murmur and some relief to pain, but the aneurysm continued to grow. He was wired a second time, May 31, fifty-six days after the first wiring, the pain having returned with increased severity. The pain was again relieved by the wiring, but he died apparently of exhaustion, July 5, 1910, about five weeks after the second wiring.

At the autopsy the aneurysmal cavity was found to contain a large amount of silver wire with the loops descended into the left ventricle, as above stated. The wire in the aneurysm was densely intermingled with a rather firm partially organized clot.

Dr. Robert N. Willson, Jr.: I asked Dr. Hare whether he cared to have the other side of the wiring problem presented here, and he has encouraged me to mention the unfavorable results of a series of wirings done by us at the Philadelphia Hospital. I have wired there six large aneurysmal sacs, several in association with Dr. Hughes. Of the series of six, four were thoracic aneurysms, two abdominal. Five died within three days after wiring. In all cases the wiring and the application of the current were carried out practically as outlined by Dr. Hare. About the same time was consumed; gold wire was used in all; all showed marked relief from pain immediately following operation. One of the patients went back to work and lived for several months. Not one of the six was benefited permanently. We have the specimens of the other five in the museum, the gold wire being present in all. In two of our cases the wire burned off during the operation, though connections were remade and we were able to continue. We found the wire at the postmortem examination. While our immediate results were invariably good in the matter of affording relief from pain, almost without exception the wiring seemed active in hastening the end. It might easily have been that the patients would have lived indefinitely if we had not introduced the wire. Dr. Morris J. Lewis could tell of a patient, whom I have seen for him many times during fourteen years, with a large slowly growing aneurysm under

the upper piece of the sternum. The patient has been living with reasonable comfort during the entire time.

Dr. Hare, closing: In answer to the question whether the wire is at times absorbed, I would reply in the affirmative. I have known of one other case already reported in which the man I had operated upon died suddenly from some unknown cause. I simply heard that he had been found dead, and only with great difficulty I secured an autopsy which was limited to the chest by the directions of the family. Upon opening the chest no wire was found, and the man who made the autopsy, very rightly, looked widely through the body to see if it had gone anywhere else, but it was not found. I do not know, whether finding a tiny point protruding he had for amusement pulled it out, or whether it had undergone some process of absorption. I am inclined to think the wire in some cases may have been partly destroyed by the electrolytic process, particularly if by any mishap the negative pole instead of the positive were used. I know of one instance in which this occurred. Of course, electrolysis at the negative pole means alkaline reaction and solution; at the positive, acid reaction and coagulation. In all the cases in which there has been enough electricity to "burn off" the wire, so much current must have been used to cause necrosis.

The most notable effect in my series of 25 cases is the relief of pain. In one of the cases, reported here two years ago, and which I wired for Dr. Musser, before the current had been passing for twenty minutes the man said "The pain is leaving." An interesting point in connection with the case is that the day before we were to wire him be developed aphasia and partial hemiplegia. Had this occurred after the operation we would have thought it a result of an embolism from wiring. We had to keep him under morphine for several days because we did not dare wire in the presence of embolism.

Like every other operation, this must be done in the right way. The wire must be pretty stiff; must have a definite spring, so much so that if handled, it springs into the air. It must have temper.

I do not see how coagulation can fail to occur, provided there has been no mistake in the use of the poles. The relief of pain I attribute to two things. I have not much confidence in electro-therapeutics, but there is a sedative influence from the galvanic current. It seems reasonable to assume that relief is due to this and the removal of the strain on the sac by the clotting. One case operated two years ago in New York, an hysterical Israelite, was in tears before the operation began. After the current had been passing for twenty minutes the man began cracking jokes about the political situation in New York, and volunteered the information that the pain was less.

One point of considerable interest in these cases which do not improve, or have a return of the pain, is that often there is more than one aneurysm. In one case greatly relieved by the operation there was after several weeks aggravated pain and the man suddenly died, apparently from rupture of the aneurysmal sac. It was found that there was an aneurysm in the abdomen which had eroded the vertebræ. It was the second aneurysm which had caused the pain.

Another point of interest is that if in a man whose bloodvessels are excessively diseased, you cause a clot to form in a sac; naturally, if the edges of that sac are not supported by wire, you are apt to have a second aneurysm develop. Just this took place in this man shown tonight. After walking sixty miles he developed a new aneurysm near the old one.

Whether we shall operate is a question of whether or not we shall allow a man to live in pain. If any one had seen the desperate condition of this man four years ago there could have been no hesitation about the wisdom of operating. I would not have operated upon him, having only the silver wire, had his condition not been so desperate.

Regarding the selection of cases. As soon as a man begins to wire every aneurysm that comes to him he will have some bad results. I do not mean that other men who have spoken tonight have wired carelessly. Within the last two months I have seen two cases in which the operation would not have been justifiable. In one case the sac was filled by a laminated clot. The other case was that of man coming into the hospital with a history of pain and bulging in the third interspace to the right. There was present a small expansile mass. There was so much breath sound around the growth that I questioned whether the needle could be inserted without puncturing the lung. On the other hand in some of the more desperate cases the skin over the aneurysmal sac has been black and blue. In one such case the patient was wired in May and later was wired in two places at one sitting and died from rupture of another sac than the one wired.

THE UNDERLYING FACTORS IN THE SPREAD OF TUBERCULOSIS[1]

By ALBERT PHILIP FRANCINE, A.M., M.D.

There are two broad phases in the communicability and spread of tuberculosis, which in orderly procedure are best discussed separately, the social and economic side of the problem, and the more strictly medical side.

In placing the responsibility for the spread of infection, we must in the last analysis begin with the individual, rather than the institution. It is, theoretically, more the fault of the people than the fault of their surroundings. It is the fault of the people who make the homes. This great plague lives and flourishes in the homes of the ignorant, amid poverty and squalor; but, as has been well said, it is not alone the buildings which make the slums, but the people who live in them. Of course, bad housing conditions play a profound role in the endemicity of tuberculosis, but even could we give every family an airy, clean house, so long as there were ignorance, carelessness, filth, dissipation and alcoholism we would still have slums, infected houses, and tuberculosis.

It is perfectly apparent, that better housing conditions would be an enormous stimulus to better living and better home management; and, therefore, while the first remedial step is education and uplifting among the poor and ignorant themselves, the second corrollary need which is of equally pressing importance is to improve physical conditions of living, improve housing conditions. The problem of proper housing conditions for wage earners and

Read March 4, 1914.

others of small income is of vital importance to every community and the baneful effects of basement housing and overcrowding are in no way more apparent than in the spread of infections of all sorts, particularly of tuberculosis, and the entire physical and moral health of a community is adversely affected by bad housing conditions. Next in importance in this relation, comes the subject of conditions of labor or occupation. For, aside from faulty ways of living and bad places to live in, there are the many vile conditions of labor which reduce the health and weaken the resistance of the individual, making him susceptible to infection and making him and his descendants less and less likely and able to bring into the world and rear healthy, robust children.

In mentioning conditions of labor, however, as an important element in the prevalence of tuberculosis, we must think clearly and understand that the many bad conditions which exist are largely predisposing factors only, and their true significance relates to the demoralization of the health, morals, and social status of the individual; and to home conditions from inadequate wages. Because the morbidity from tuberculosis is high among a certain class of wage earners, we must not jump to the conclusion that that kind of work specifically "causes" tuberculosis. What it really does is to reduce the general health and resistance of the individual, and if such workers have the seed of tuberculosis in their bodies, as is often the case, undue fatigue, confinement, low wages, give rise to the physical conditions necessary for the flourishing of the seed. There is no specificity of labor as a "cause" for tuberculosis. It is an enormous factor, but never a cause (eliminating infected workshops). It comes the nearest to being a cause where certain forms of dust are constantly inhaled, which act (in one way at least) by reducing the tone and resistance of the lungs themselves, and so predispose to the pulmonary localization and activity of already existing infection, or a fresh infection.

For ethical and hygienic reasons the common drinking-cup must go, but tuberculosis is the least likely of the infections (so far as adults are concerned) to be engendered in this way. Whether this should be made to include the common Communion cup

may be answered, perhaps, in the affirmative on account of the danger of certain infections, but so far as the spread of tuberculosis is concerned, this is a negligible factor.

It is thus recognized that the problem of tuberculosis is in a large sense a social and economic one. With such factors to contend with, having their roots deep down in the very basis of modern life and conditions, affecting millions of people, is it not right that we should at least pause to appreciate the vastness of our undertaking, and from its very vastness should we not draw resolve to pursue our aim indomitably and to be patient in demanding too immediate results, though it should be stated in passing that results are becoming strikingly apparent.

Thus let us neither forget nor be dismayed by the fact that our problem is to combat, one might almost say, the drift of the times, to raise through education, sanitary laws, medical hygiene, and philanthropic effort the proletariat from their condition of dense ignorance and poverty, to enable them to get suitable homes and teach them how to live in and manage them, and to improve the conditions of their labor—that there may be cleanliness and light, suitable care of the children, sufficient food and clothing, necessary hours of rest, provident and good habits and self restraint; and available medical supervision. But having said this much, we have not said all, for we must do this same Augean task for the thousands of immigrants arriving hourly from Europe to swell the ranks of this great army of ignorance and poverty.

But there is one great satisfaction to be taken in the very breadth and vastness of this phase of the problem, namely, that it is not merely tuberculosis work, but public health work in whatever form of activity this shows itself. Antituberculosis work, and all forms of public health work in general, bear an increasingly apparent interdependence. It is not alone strictly antituberculosis measures which may be confidently looked to for results, but all the associated movements for the public welfare in health, morals, and conditions, which are essentially allies. This is now fully recognized and with the well organized tuber-

culosis crusade pointing the way, other movements have followed along similar lines and the crusade of enlightenment and prevention of disease is becoming more and more a unit in its methods, aims, and interrelationships.

It is necessary next to consider certain salient features of the disease itself, bearing on the question of the spread of infection. Two great factors in its communicability stand out.

Infection takes place from close personal association or contact with open tuberculosis, as by living with a consumptive or from living in a room or house contaminated by a consumptive. The great source of the infection lies in the carelessness of the individual consumptive in contaminating his surroundings, by spitting about or not properly disposing of his sputum; or by spray infection from coughing (equally dangerous) without guarding the mouth with a paper napkin. His towels, bedding, table utensils, etc., are also a source of infection. The period at which a consumptive is most dangerous covers, of course, the second and third stages of his disease when the lung is breaking down and the sputum contains large numbers of living tubercle bacilli.

The age at which infection is most likely to take place is childhood. It should be borne in mind that adults, particularly healthy adults, have a very considerable resistance or immunity to tuberculous infection. Without discussing the question of the sources of this relative immunity, it may be stated as a fact that it requires a prolonged exposure and implantation to give rise to pulmonary tuberculosis in an ordinary healthy man or woman. In proportion as bad surroundings, faulty personal hygiene, bad conditions of labor, other infections, dissipation, etc., play a part in the life of the individual, by just so much is this natural or acquired immunity impaired or even broken. But the fact remains that the chance inhalation of tubercle bacilli as they may float in the dust of the street, or in public meeting places, or the occupancy for a night or two of an infected room or sleeping berth, could hardly give rise to pulmonary tuberculosis in an adult.

This must not be misinterpreted as in any sense condoning infected dust or infected places. No inference can be drawn

from this that spitting in public places, street cars, or on the sidewalks should be tolerated. On ethical grounds and because of the dangers of catarrhal infections, spitting should be (and is in many communities) a misdemeanor punishable by law. The danger of infection of children by such conditions is a very possible one.

For the time at which this natural resistance is weakest is in childhood, and for this reason and because of intimate and prolonged contact with open tuberculosis in their homes, children furnish the great soil for implantation. For physiological reasons, which would lead us too far afield to discuss, this infection during childhood does not as a rule develop into pulmonary tuberculosis at that time, but lies dormant in the lymphatic system or is latent until adult life, when it breaks forth or manifests itself in pulmonary localization. It is largely children infected by contact in their homes who furnish later the ever on-coming crop of consumptives.

Milk and meat from tuberculous animals also constitute a source of infection. Infection from cow's milk has been variously estimated as being responsible for from 1 to 10 per cent. of cases in infants. Infection may also be hereditary, the direct transmission of the tubercle bacillus taking place from mother to the fetus by placental circulation. This has been shown to occur in mothers with advanced pulmonary or miliary tuberculosis, but has recently been shown as also possible where the lesion in the mother is in the incipient stage or even latent or non-active at the time of the birth (Warthin).

During childhood and early adolescence this early tuberculous infection, glandular in type, may not manifest itself at all, or only in anemia, underdevelopment, etc., these children being generally below par physically and delicate. These children react to tuberculin and often have enlarged lymphatic glands, but there is no other way in the majority of instances of telling that they are tuberculous. But this is quite sufficient for the diagnosis, which is to be understood to mean that the moment a child reacts to tuberculin, it is conclusive evidence that it has

been sensitized by the tubercle bacillus and that the moment a child is thus tuberculized it becomes potentially at least a future case of pulmonary tuberculosis.

Not only the general trend of expert opinion bears out the above view in relation to time of infection, but there is much clinical and pathological statistical data to confirm it. The results of the tuberculin test, which when properly performed and repeated is recognized as being specific, in large groups of children in hospital practice, as reported by von Pirquet, Calmette, Hamburger, Frantz, and others in widely different cities, warrants the statement that most children of the working class, are sensitized by the time they reach fourteen or fifteen years of age. All authorities admit that at least 75 per cent. of the population will react to tuberculin. From postmortem findings, evidence has been clearly accumulating as to the frequency with which the disease is found at necropsy among the poorer classes; and, with increased refinement in postmortem work, the percentages are getting significantly greater. Nageli reported definite signs of tuberculosis in 97 per cent. of all bodies examined consecutively. Hamburger, in a large group of children, reported postmortem findings of 63 per cent. with tuberculous lesions between the ages of seven and ten years and 95 per cent. in those between eleven and fourteen years of age. Ghon's postmortem statistics from St. Elizabeth's Hospital in Vienna show that by the end of the third year 6 to 8 per cent. are infected, the percentages rapidly rising until by the fourteenth year the infection reaches 92 per cent. It goes without saying that by no means all these cases would have developed pulmonary tuberculosis clinically had they lived; indeed, this early infection is by many looked upon as a source of immunity to subsequent reinfection, but such statistics furnish valuable evidence of the time when primary infection takes place.

There arises here an interesting paradox, for while we know that infection with tubercle bacilli is so largely universal in childhood among the poorer classes in our cities, yet we also know that the death-rate from tuberculosis among urban populations has

been steadily decreasing. To what is this due? Is it due to strictly antituberculosis measures, in association with preventive and curative measures against disease in general; is it due to institutional care and improved conditions of living? Or is it due to some deeper cause, a development of increased resistance, specific immunity or allergy (von Pirquet) in urban populations themselves? Recent discussion has concerned itself very much with this phenomenon, and authoritative opinions differ.

Thus Newsholme points out that while the death-rate from tuberculosis is nearly always greater in urban than in rural districts, the countries showing the most urbanization have secured the greatest reduction in, and the lowest death-rate from, tuberculosis. The conclusion that he draws from this fact is that the death-rate from tuberculosis has declined to the greatest extent in those countries in which the ratio of institutional to domestic relief has been highest. A consideration of all the facts, he says, justifies the conclusion that the substitution of institutional for domestic relief for the consumptive poor has been historically the main factor in the reduction of this death-rate, and in a later paper he repeats that had it not been for the steadily increasing extent of institutional treatment of the sick, and especially of the consumptive sick, which has characterized most of our great centres of population, we should have experienced not the decline of tuberculosis which has occurred, but a great increase in its prevalence. With this view I am in entire accord. Hermann Biggs says "in the judgment of those who have most experience in the study of the problem, no other measure for the prevention of infection compares in importance to the treatment of advanced cases in hospitals and sanatoria."

On the other hand no less a distinguished investigator than Karl Pearson has suggested that the selective process of many years of heavy mortality from tuberculosis has left us with a more immune and resistant population. He would have us change our views as to the value of hospitals and sanatoria in the prevention of tuberculosis, and devote all our efforts to raising the resistance of the individual and the race. In brief, he denies the value of

our general campaign, says that we are all tuberculized, and that the only efficient source of prevention lies in developing this communal or race immunity, which is largely a matter of environment and heredity. T. D. Lister goes so far along these lines as to say that were it for a moment to be granted that it is possible to control the spread of tuberculosis by preventive measures, then the service rendered to urban populations would be dangerous instead of beneficial, because the development of what he considers the only important factor, namely, increased communal resistance, would be ignored; and he further adds, that in his opinion the adult death-rate from tuberculosis may be taken as a measure of the loss of resistance to latent tuberculosis acquired in childhood.

A phase of this latter view is seen in much recent literature based on the studies of Roemer, Hamburger, von Pirquet, Baldwin, and others, which has been recently emphasized by the last-named investigator, who believes that a primary infection in childhood is of value as a protection against subsequent reinfection by the production of a specific allergy or changed condition. This corresponds, of course, to what we know in regard to the increased resistance to reinfection in experimental animals from a primary inoculation. As an illustration of this view, may be cited his belief that the development of a strong allergy is at least one reason why miliary tuberculosis is not more frequent during relapses and extensions of pulmonary tuberculosis, particularly since we know that the bacilli themselves are often free in the blood-stream. Applying this, he feels that most adult tuberculosis is not due to a new infection or reinfection from contact, because the allergy of a childhood infection, so universally present, has protected against this, but that most adult tuberculosis is due to a lighting up of the disease from the spread of autogenous superinfection brought about by extraneous conditions of environment. Thus he argues that adults are very little endangered by close contact with open tuberculosis and not at all in ordinary association—childhood is the time of infection, youth the time of superinfection, and that from extension of the primary disease.

With which view, except as it might imply a relaxation of any of our usual precautionary measures against the possibility of infection among adults by contact, I am largely in accord as stated above. Such theories inevitably lead back to the fundamental principle of eugenics, which lie not strictly in the survival of the fittest, not strictly in an attempt to rear a race of men and women whose resistance is attuned to living and surviving in a germ-laden world and who are capable of withstanding an utterly vile and vicious environment; but rather in forming a pure, healthy, and happy environment, in making the world a fit place for all to live in, and then in producing the best and ablest race both physically and mentally to inhabit that purified environment (Moore).

Certain phases of the views quoted above appear radical and perhaps unwise general teaching (see Pearson), but whatever the element of error or of truth, and the truth probably involves a middle course, these views have at least served the purpose of calling the attention of those interested in the crusade to this very important element of racial and communal resistance whether natural or acquired by early infection, which we have perhaps been inclined to overlook and neglect; and the practical necessity for directing every effort by good food, rest and recreation, by airy schools, playgrounds, inspection and supervision, to raising this quality of resistance, particularly in childhood and early adult life.

It may be stated as a fact that tuberculosis is the most common infection of childhood, and, as well pointed out by Philip, we must get rid of the artificial distinction between so-called medical and surgical tuberculosis. From the scientific stand-point, the most slender seedling of tuberculosis is potentially significant. It is impossible to say which tuberculous seed will be cast off and which will mature. Inoculation may occur through the mucous membrane of the gastro-intestinal or respiratory tract, or the skin, and whether it will spread from the lymphatic system, which is the first site of this early infection, and develop into pulmonary tuberculosis later, depends largely on the child's vitality and

resisting powers through its living tissue cells, and upon its environment. In other words, this quality of natural or acquired immunity may hold the infection dormant; may heal an active lesion in its incipiency, or localize it in the glands or bones; or may give way with resulting meningeal, miliary or pulmonary involvement. The course of events which supervenes, is dependent largely on extraneous circumstances, on the amount and character of the tuberculous infection, on the number and character of the acute infections to which the individual is exposed; on enforced environment and to considerable extent on inherited qualities. Philip says:

"The problem can only be solved effectively by a better understanding of the physiological needs of developing life and a corresponding renovation of the nurseries and school-rooms of the nation. It is folly to dream of transferring all tuberculous children to preventoria or sanatoria. This plan is to plead ignorance of the essential needs of the problem. The home of the poor man must be made the nursery of healthy children and cease to be the breeding ground of tubercle-tainted wastrels. Each recreated home is an effective preventorium against tuberculosis."

It will thus be seen that the problem of prevention to be effective, even as limited to the medical aspect of the communicability of tuberculosis, must not only take into account the care and isolation of the consumptive himself, but also the care and development of the children who have already been infected or who may be exposed to infection, and probably the development of a specific racial immunity. But when we consider as essentially one, as we must do, the two broad phases of the problem, which I have attempted to outline above, namely, the social and economic conditions, and the more strictly medical conditions responsible for the prevalence and spread of tuberculosis, the point previously emphasized is brought forcibly upon us—how very apparent is the interdependence today of the tuberculosis campaign and all efforts looking to the common welfare! Let me repeat, that it is not alone from the strictly antituberculosis campaign that we may confidently expect to control tuberculosis, but from all

allied movements looking to improvement of the health, morals, or condition of the people. Folks says: "If our task is the more difficult because it is bound up with every phase of modern civilization, it is equally true that every substantial advance in other lines assists our cause."

For instance it has been pretty conclusively shown (Reinicke) that wherever the death-rate from typhoid fever is reduced, through the introduction of pure water, numerically by one; there is a simultaneous reduction in the general death-rate of from two to three. What is true in this case, is equally or even more strikingly so in relation to other infections. Think of the vista of accomplishment which opens up before us, when we know, as we do know, that more than 80 per cent. of all deaths are due to preventable causes!

Thus it is apparent that the movements against infant mortality, venereal diseases, alcoholism, the infectious fevers, cancer, procreation of mental defectives; and the correlated campaigns for better housing conditions, better hours and conditions of labor, child welfare work, etc.; all these movements, public or private, of whatever scope and by whatever methods they proceed, are all working to a common end, the welfare of the race, and as such are prototypes and allies of each other and of the greatest of them all, the tuberculosis campaign. They are all campaigns of preventive medicine, based on scientific development and attempting, largely by education, to carry the message of health and right living into the homes and very hearts of all the people.

DISCUSSION

Dr. James Tyson: Dr. Francine has well stated the grounds on which is based the spread of tuberculosis, and I have nothing more to add to what he has said; but, a question has been raised in my mind only today, which I would like him to answer if possible. Is there any reason to believe that the ascendency in the struggle against tuberculosis which is being claimed, viz., by diminished morbidity and diminished mortality

has been at all reversed; whether, in a word, instead of an improvement today as compared with the conditions twenty years ago, the opposite course is going on? It is not always safe to quote from the daily papers; but my question is prompted, in part, by a statement which I read in today's "Ledger," a telegram from Paris, to the effect that in France the mortality from tuberculosis had doubled in the last twenty-seven years, while on the other hand, we have been claiming that tuberculosis has been decreasing during this period.

Dr. Francine, closing: I have to say, Mr. President, in reply to Dr. Tyson's question, that there is not the slightest possible doubt that the percentages for the mortality from tuberculosis in relation to the population has been steadily and rapidly diminishing. Whereas, in Pennsylvania in 1906 the death-rate per 100,000 was 150.9, it has fallen steadily until in 1913 it was 121.8. There is some confusion from the fact that the morbidity is apparently greater because we are reporting more cases of tuberculosis today, as we are reaching more, routing them out in their homes by our social service work, and our system of reporting them is better. Therefore, the number of cases is apparently greater but not proportionately so. It is only since the law of 1905 that Pennsylvania has had any system of reporting births and deaths; previous to this men and women and children were born, lived and died in the smaller towns or rural districts with less chance of official record being kept of them than was the case with high-bred cattle and dogs. Since registration has been introduced in Pennsylvania the following figures tell the tale of the reduction in the death-rate from tuberculosis most vividly:

Deaths from All Forms of Tuberculosis for a Period of Eight Years 1906 to 1913 Inclusive, and the Death-rate per 100,000

Year.	Population.	Deaths.	Rate per 100,000
1906	7,141,766	10,780	150.9
1907	7,279,972	10,825	148.7
1908	7,417,816	10,211	137.8
1909	7,555,841	10,122	133.9
1910	7,693,866	10,285	133.7
1911	7,831,904	10,604	135.2
1912	7,969,904	9,872	123.7
1913	8,107,942	9,706	121.8

CERVICAL ADENITIS[1]

By NATHAN P. STAUFFER, D.D.S., M.D.
OTOLOGIST AND RHINOLOGIST TO THE PRESBYTERIAN HOSPITAL DISPENSARY; ASSISTANT OTOLOGIST AND RHINOLOGIST TO THE PENNSYLVANIA HOSPITAL DISPENSARY; LARYNGOLOGIST TO THE TUBERCULAR WARDS OF THE BLOCKLEY HOSPITAL

THIS paper is presented after reading the excellent article by Dr. J. H. Jopson lamenting the lack of unanimity upon the part of the profession regarding the treatment of the troublesome and common children's disease, cervical adenitis (Fig. 1).

Dr. Jopson was correctly led to defend operative measures by reading a medical journal's advice to a general practitioner advocating internal and local treatment for these enlarged nodes until they suppurated; and he also objected to another surgeon's paper complaining of the large number of recurrences following radical operations upon cervical glands.

I wish to present tonight the rhinologist's observations on cervical adenitis, as most of the papers on this subject have come from the general surgeon's hands and I believe they see the later stages of the disease when cures are most difficult to obtain. It is my intention to discuss the causes, the effect on the child, the parent and the public of cervical adenitis. I will include my reasons why I believe internal and local treatments failed and why many external operations were unsuccessful. Some ideas in this paper were declared before the Orthodontia Society of Philadelphia in 1910, and the Tri-County Society of New Jersey in 1911, when

[1] Read April 1, 1914.

I gave my results of many adenoid and tonsil operations. Later results from over a hundred cases still further confirm these beliefs.

Seventy-five per cent. of cervical adenitis cases can be cured by the methods which I shall describe later and without external operations. In the remaining 25 per cent. may be: (1) Those which are not true cervical adenitis but soft lymphadenomas with

Fig. 1.—Cervical adenitis. Cause, adenoids and hypertrophied tonsils.

enlargements of a group or groups of lymph glands as described by Stengel; (2) Hodgkin's disease where there is a progressive general hyperplasia of the lymph glands, but no increase of leukocytes, and with seldom a necrosis or suppuration; (3) The forms reported by Symmers, "a type of Hodgkin's disease" exists either primarily in the cervical region or in the thorax in which growth may invade surrounding structures and imitate secondary nodules

in distant parts; (4) The true lymphatic leukemia as described by Osler with the usual increase in leukocytes and the enlargement of the superficial groups of glands; (5) Or the sarcomas. Many of these latter cases cannot be cured by any operation and if they are opened do not usually contain tubercle bacilli.

Fig. 2.—Five years later, after removal of adenoids and tonsils. Complete cure and no recurrence.

There is a distinct group of cervical adenitis cases which is most common in children between the ages of two and seventeen years, in this portion of America, who show a gradual enlargement of the submaxillary or cervical glands proceeding slowly from gland to gland and gradually following each other in breaking down and suppurating. According to Dr. Jopson, 90 per cent. surgically treated are in this group.

Anyone who has handled these difficult cases with their months of gradual glandular enlargement and an ever-increasing irritability of the child, followed by the suppuration stage with its months of constant dressing, the unsightly after-scars or fistulas,

Fig. 3.—J. N. R., aged twenty-one years. This patient has had four operations in twelve years for enlarged suppurating cervical glands. Now has a recurrence. The cause, adenoids and hypertrophied tonsils still present in throat. Note large disfiguring scar and enlarged gland under chin.

not to mention the expense, must realize what a terrible burden they are to the parents as well as to the patient.

The preventive treatment and cure is not expensive nor difficult, and I am sure if only applied early enough will prove as successful in other surgeons' hands as in mine.

When we consider that 30 per cent. of these enlarged cervical glands are followed by tubercular lesions in other parts of the body the need of acting promptly is certainly apparent, especially as the operative mortality is practically *nil,* Mayo operating on 649 cases with 2 operative deaths, and Dowd 465 cases with 2 operative fatalities. When a child has enlarged glands he usually begins to lose weight, has a capricious appetite and becomes pale and lacks ambition, the parents are naturally worried and if the glands are not soon relieved are apt to wander from one physician to another. Usually the end is in the hospital or dispensary, when it is too late to relieve his condition by the adenoid and tonsil operation, and you are compelled to operate externally and internally. Dr. Jopson correctly states that any surgeon knows that it is a very tedious operation to dissect these glands.

The reason that I became interested in cervical adenitis was due to the number of scars on children's necks that I observed, commonly called, "tubercular gland scars" (Fig. 3). Many of these children had been in general surgeons' hands and had recurrences. While I realized the causative agent might be Bacillus tuberculosis I knew many pathological examinations did not always reveal the presence of this bacillus, but of other organisms as well, the text-books did not explain the mode of entrance of these bacilli into the child nor why the glands enlarged (Fig. 1). It was necessary to determine the entrance of the bacillus into these glands. I knew they were a primary and not a secondary infection following tuberculosis of the lung. Meeting children day after day in the Pennsylvania and Presbyterian Hospital Clinics, I noticed these enlarged glands were usually in the children who were mouth breathers, tonsillitis habitués, or purulent otitis media cases. Investigation followed along the lines of the circulation and drainage of these cervical lymphatic glands, to locate the portal of infection (Fig 4).

The Lymphatic Circulation.—The word lymphatic is derived from lympha, meaning water. (Lymphatics are also absorbents.) A lymphatic, or lacteal vessel, previous to entering a gland divides into smaller branches or afferent vessels as a

water carrier. On emerging from this gland there is another plexus formed called efferent vessels. Gray divides the glands of the neck into the superficial and the deep lymphatics. Further subdividing them according to their location into occipital, post-auricular, parotid, zygomatic, buccal, and submaxillary, etc. All these glands drain into the lymphatic glands of the neck,

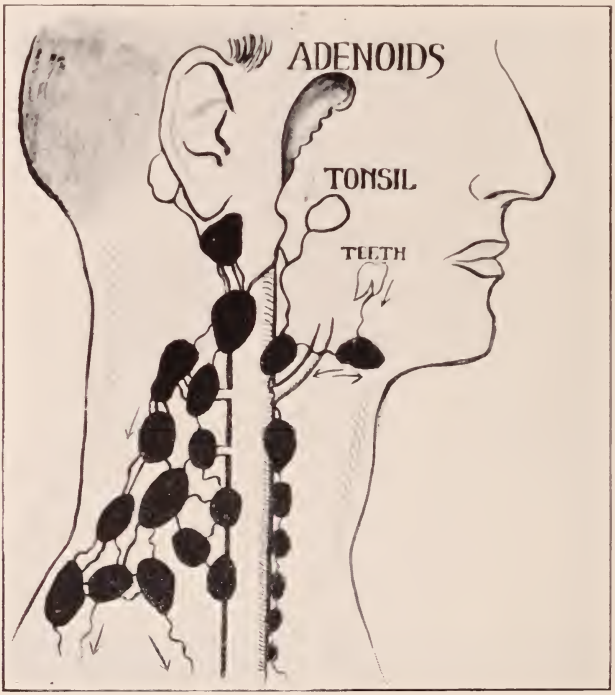

Fig. 4.—Showing drainage of the adenoids and tonsils, teeth and ears into the lymphatic circulation of the neck.

where they further divide into the superficial and deep cervical groups. As you are all familiar with the details of the anatomy of these parts all I need to recall is that these cervical glands of the head, face, and neck, drain immediately into the thoracic duct as it empties into a large innominate vein at the root of the neck between the internal jugular and the subclavian veins, from thence

the circulation of the lymph is carried to the heart and lungs. As Dr. George Wood so ably demonstrated the possibility of tubercle bacilli being carried from the tonsil to the cervical glands and thence to the innominate veins you can easily imagine the next probable lodging place is the lungs. Hence we have established another means of contracting tuberculosis, apart from inhaling the germs, a pathway to me far more dangerous than the air passages. These cervical glands are acting as sentinels (or forts) lying under or below the adenoids, tonsils, teeth and ears; their duty is to immediately try to repel or destroy any invading host. If unable they call upon the body for reinforcements, whereupon the gland enlarges. If the invading host is more powerful the gland suppurates and the invasion may become general and septicemia or tuberculosis has become established. Just as in an abscess of the hand the glands of the elbow and axilla try to repel the infection and if they fail ultimately break down. Similarly a lymphadenitis of the inguinal glands may follow a gonorrheal urethritis. Seeing these glands enlarge between the head and the upper portion of the thoracic cavity, realizing that glands usually enlarged from irritation above them, I naturally examined more in detail the most adjacent structures, which happened to be the adenoids, the tonsils, the teeth, and the ear.

1. "Adenoids are superficially placed lymph glands most frequently found between the third and fifteenth years of age" (Ballenger), (Fig. 5). It is a physiological structure which atrophies before adult life. Note the close relationship of the adenoid age, three to fifteen years, to the cervical adenitis age, two to seventeen years, as stated by Mayo, Dowd, Müller, etc.

Many parents have queried, "Why is it we never heard of adenoids in the olden times?" I reply, "Why did we not have phonographs one hundred years ago?" They were not discovered. Adenoids were also undiscovered. I can show you some prints that are proof positive that people had adenoids as far back as 1524 (Fig. 6). "Reproduction of the portrait of Emperor Ferdinand I, of Germany, King of Spain, painted by the great Dutch painter Lucas, of Leydon. It is in the gallery of Florence,

and is such a typical adenoid facies that from it alone a diagnosis of the affection can be made today, more than four hundred years later. The usual well-marked Hapsburg family type has been completely lost through obstruction to nasal breathing for many years. The whole face is elongated, the nose is pinched and drawn, and the small nostrils all show retarded bodily development." (Allbut and Rolleston.)

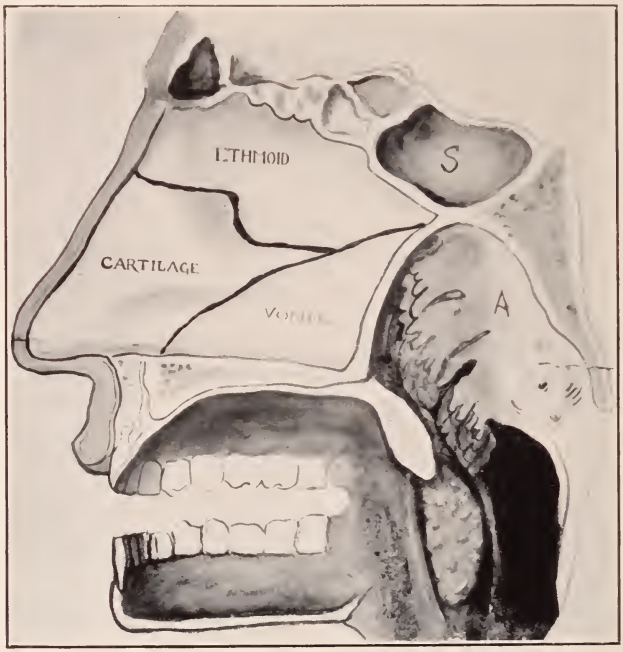

FIG. 5.—*A*, hypertrophied adenoid blocking off air supply and causing enlargement of tonsils and cervical glands.

2. The cause of the hypertrophy of the adenoids is constant irritation and then inflammation (Fig. 5). Children, especially, do not understand how to blow their noses when they have colds, consequently the nasal discharges are retained in the nares and postnares, causing further engorgement of the turbinal bones, thus these bones cause the exit to be still more effectually

blocked off. The whole nasal mucosa feels this extra invasion of debris and bacteria, the engorgement and nasal stuffiness is increased, and the irritation and inclination to adenoid hypertrophy is present and the first step toward cervical adenitis has been made.

FIG. 6.—Illustrating how even kings appeared to have had adenoids in 1524.

3. The actual cause of the disappearance of adenoids after fifteen years of age is due to the growth of bone and the gradual enlargement of the postnasal cavity allowing air to pass; another cause is the development of a fibrous tissue, especially around the bloodvessels of the adenoids.

As I previously stated, adenoids usually disappear before adult life, then you will ask me:

1. "If they disappear usually after fifteen years of age why operate?" Because they cause so much damage beforehand, as

mouth breathing is established for life, cervical adenitis follows, then otitis media, and mastoiditis, etc. *The pain, inconvenience, and cost of these is more than most parents can afford.*

2. Some people say, "Nature evidently meant us to have them or why did she give them to us?" If so why does she atrophy them after twenty years of age and why do so many children not have them? As an example of how Nature will reproduce what she needs, you will recall how our teeth were erupted from six months onward and then decayed, but were replaced by a secondary set. Why are the adenoid and tonsil in some people not replaced after the fifteenth year, while in others they are large enough to block the entrance of the food into the throat, as the patient shown tonight.

Cause of Adenitis.—After examining thousands of throats and finding many adenitis cases linked with hypertrophied tonsils, I concluded the cervical adenitis was due to the irritation placed upon the lymphatic system by these overworked and necrotic adenoids and tonsils, and I concluded that the next child that I saw with cervical adenitis I would first operate upon the adenoids alone to see what effect it would produce upon the adenitis.

My next patient had had a brother who had been operated upon for purulent cervical adenitis, and the involvement (and operation) had been so widespread that a paralysis of the face had resulted (entire left side). Now the brother was younger and had presented the same early symptoms of acute adenitis. His father desiring to save this child the trouble and disfigurement of the older boy, brought him to me. I found he had acute cervical adenitis (the glands were the size of peach stones and hard), and was a mouth breather with the typical night terrors and enlarged tonsils. I informed his father of my conviction that the glands were enlarging from nasal and pharyngeal irritation and asked permission to first remove the adenoid growth and if found necessary afterward dissect out the diseased cervical glands. After the adenoids and tonsils were removed the enlarged glands immediately became smaller and the child is a healthy robust boy at this date, four years later, and no operation was ever necessary on those enlarged cervical glands; they disappeared as if by

magic. Since that day I have found the adenoid and tonsil operation sufficient to cure all cervical adenitis cases if the operation is performed early, *i. e.*, before the glands have proceeded to the suppurative stage. I will show two cases tonight who are in this preventive stage, which are caused by hypertrophied tonsils and adenoids.

But the early and complete dissection of the tonsils and adenoids will not permanently cure the cervical adenitis, even though the general surgeon has dissected out the tubercular glands, if the teeth and the ears are also in need of proper attention. Why the teeth? What has the dental profession to do with the condition? Just this, adenoid patients are mouth breathers, usually they have trouble with their teeth, either early or late in life. Cervical adenitis may come from adenoids, tonsils, or from decaying teeth. Dr. Starck, a Frenchman, was the first to find tubercle bacilli in decayed teeth. Dr. G. M. Dorrance reports 72 cases of cervical adenitis in which 45 cases were caused by decayed teeth; his minority were from the tonsils.

Usually adenoid patients have malocclusions. I recall one patient who had a marked malocclusion. This patient had adenoids which were not removed because the family physician was opposed to the knife. This patient to this day can only use the four molar teeth. If he had had a competent dentist, or a good specialist to examine his nose, he might now sleep in peace instead of being compelled to awaken each morning with a dry and parched mouth, with brown crusted teeth causing premature decay (Fig. 7).

That nasal obstruction has close relation to the cause of oral deformity most rhinologists agree. Kyle says: "The effect of impaired respiration due to postnasal obstruction is also manifested in an ill-formed supermaxillary arch, with marked irregularity in the arrangement of the teeth. A blocked-up nose means the drainage, or lymph system has extra duty and then the glands will soon enlarge. Unless perfect nasal breathing is established before the seventh year the individual becomes of necessity a mouth breather, a habit difficult to rid one's self of (Fig. 7).

This irregular development is largely caused by the repeated contractions of the muscles controlling the nasal orifices necessitated by the forced nasal inspiration and sniffling. By this drawing down of the facial muscles the upper jaw is retracted and the contours of the upper arch is altered. The hard palate instead

Fig. 7.—Mouth breather. Sensitive because family and friends chided him on having mouth constantly open. Adenoids and tonsils had been removed but another cause of mouth breathing was still present. A deviation of septum entirely blocked left nares. Note malocclusion of teeth. Unable to shut mouth or thoroughly masticate food. Submucous operation and complete cure.

of forming a perfect dome, has its anterior portion tilted out and its upper portion at the base of the nose, drawn in (Fig. 7). Without this interference the pressure of air within the natural passage counterbalances that upon the external surfaces and normal development takes place. This will occur only when the obstruction takes place in early age, before the bones are

firmly united. This irregularity in the arch will produce unevenness in the development of the teeth, causing their eruption high up in the alveolar process, or if placed in the arch they will be crowded and irregular. If the eruption occurs high up, it will add to the protrusion of the upper lip, increasing the facial deformity so characteristic of adenoid obstruction."

Lately much discussion has arisen over the ability of certain orthodontists to widen the intermaxillary arch. Some time ago a Dr. Black (I believe) advocated the use of the separation of the teeth, and widening the arch to relieve nasal stenosis. Since then many men have argued pro and con as to the actual widening that does take place. Dr. Cryer, arguing that none does occur, and Dr. Darby that it does, Dr. A. B. Crane (Washington) thinks it possible, while many are in Dr. Marshon's class, those who are in doubt. Whichever side may be right the fact is that it helps the patient, and to me that is the most important point.

Whether mouth breathing is stopped because of the occlusion being made regular by the orthodontist, thereby giving a rear support for the lips, which otherwise fall apart, or whether the nasal chamber is widened by the separation of the intermaxillary suture, are scientific matters offering a field for enthusiastic pursuit and investigation. Personally I am convinced that malocclusion helps to produce mouth breathers.

Finally the ears may cause cervical adenitis. Many children with prolonged suppuration of the ears show enlargement of the glands, and if the discharge is not stopped or a mastoid operation is not done the glands continue enlarging. Then you have nose, glands, and ears discharging and the child is dull mentally, easily exhausted and finally becomes deaf. A deaf child is a retarded child, and a retarded person is a charge, for everyone who is below you mentally you are charged with. You must protect or pay to have protected.

I wish to call your attention to several important points, all relating to nasal or aural diseases, economic questions, vital facts for you or your sons:

1. Of 90,000 deaf people in the United States, enumerated in the census of 1900, 51,000 were deaf from childhood, of which number 34,000 had deafness due to catarrh (another name for adenoids or hypertrophied tonsils in children); 31,000 unclassified causes (probably catarrh).

2. Seventy-five per cent. of deafness is caused by running ears. Seventy-five per cent. of running ears are due to adenoids and hypertrophied tonsils.

3. Pennsylvania has 7500 deaf children (deaf children tend to become dumb, so you must support them). You must pay higher taxes. Extra millions every year to hospitals are needed.

4. The report for 1906 of the Board of Health, of Philadelphia, shows 31,544 defective school children. One of the best equipped medical inspectors tells me 20 per cent. of children are defective. Of these the majority have defects of the eye, ear, nose, throat, or teeth.

5. Drs. Miller and Woodruff, of the tuberculosis ward, Bellevue Hospital, report that 47 per cent. of children with tuberculosis have adenoids and hypertrophied tonsils.[1]

Summary.—Adenoids, hypertrophied tonsils, deformed teeth, and cervical adenitis are usually associated, and as these patients grow older many have rheumatism or tuberculosis. Surely such an array of facts coupled with such strong circumstantial evidence calls for prompt and radical treatment of these structures as recommended by Drs. Jopson and Müller, and which have yielded such excellent results in my hands.

In conclusion I would state that I believe the reason the majority of these adenitis cases have recurrences and are not cured by an external operation is due to the fact that they do not have the cause of the adenitis thoroughly removed.

To secure such a permanent cure I would emphasize:

Early cleansing of nose, teeth, and ears.

Early removal of adenoids and tonsils by complete dissection.

[1] Jour. Amer. Med. Assoc.

Early adjustment of irregular teeth or filling of decayed teeth or removal of decayed roots.

Early mastoid operation for any purulent otitis media present.

Plenty of good food, regular baths, exercise and plenty of sleep.

DISCUSSION

Dr. John H. Jopson: Dr. Stauffer has called attention to a fact, the importance of which is often overlooked in the treatment of this very common malady, the necessity of attention to the site of infection. He has called attention to the anatomy of the cervical glands and to the fact that they drain the region of the teeth, the tonsils, and ear, and he might have mentioned the conjunctival sac, nostrils, skin of scalp, face, etc. Through these the tubercle bacilli in the tuberculous type of adenitis, and various other infecting organisms reach the glands of the cervical region and are arrested at that point in the lymphatics. They may or may not leave traces of their presence in passing through the tonsils and other sites of infection. Dr. Geo. B. Wood and others have shown that the tubercle bacillus may pass through the tonsil or around the teeth and excite a tuberculous adenitis without leaving trace of the infection at the point of entrance. It is true that we are sometimes led to perform radical operations and neglect the attention which the tonsils or the teeth should have. This point has been pointed out, of course, before. If there is any evidence of disease of these structures it should receive first attention. At the same time we must recognize the fact that there are a good many cases in which the tonsils have remained free of disease and in which no operation short of removal of the affected cervical glands will cure. When these cases come to the surgeon I imagine that not less than 50 or 75 per cent. are past the stage at which tonsillar operation alone will cure, and while a tonsillar operation should be done before the radical operation if there is evidence of tonsil disease, I believe the majority will eventually reach the surgeon who will be called upon to remove the glands, especially the tuberculous variety. Many cases of enlarged glands due to other types of injection are mistaken for tuberculosis. If a glandular enlargement persists in the neck for two or more months it is reasonably certain to be tuberculous. It is surprising in how many cases of operation on the glands apparently in the early stages of tuberculosis we find caseation or extra glandular abscesses are present, and nothing short of complete dissection will result in cure. The fact that repeated operations have been performed

in some cases has done much to bring the operation into disrepute. We can remember in a single generation the development of the operation: first, the aspiration or incision and injection with iodoform emulsions; the opening of abscesses, curettement, removal of single glands, and the modern operation as performed by Dowd, Judd, and others. We have a reasonable degree of success in the modern radical operation, and repeated operations should not be, and seldom are, necessary. Dr. Stauffer has referred to some statements which I have made in connection with this disease. I would disclaim any originality in what I have said. I have simply called attention to the fact that in the search for new methods, such as the *x*-ray and tuberculin therapy, we are in danger of forgetting that we have a fair degree of success in the cure of these cases by surgical means. The operation is not one which appeals to a certain class of surgeons. It is a tedious one and there is little in it to attract the "gallery." At the same time, for every extra fifteen minutes or half hour the surgeon spends, he is paid by the cutting down of the number of cases requiring to be re-operated. In brief, I would say that we should look for the primary source of infection; with repeated infections locally we should eradicate the site, for example remove the tonsils. If it is distinctly proved that the adenitis will not subside under such treatment, then the radical operation should be performed.

Dr. Edwin T. Darby: I do not know that I can add anything to what Dr. Stauffer has said about the liability of the teeth to infect these glands, but we see a great many diseased teeth, the abscesses of which we think are sometimes the cause of infection in these glands. We see in the lower jaw many devitalized teeth with open cavities filled with putrescent pulp tissue and abscesses draining into the soft tissues beneath. It is not uncommon for the dentist to see two, three or more chronic abscesses in mouths of people who have never given attention to their teeth, a constant source of infection. I am not prepared to say that these are the cause of the cervical gland involvement, but the submaxillary and sublingual glands are often drained into from devitalized teeth over them.

The men who are making orthodontia a special work have learned that it is useless to undertake to correct a complicated case while adenoids are still present. One of the first things the dental surgeon requests is that the patient be taken to a specialist to ascertain whether adenoids or enlarged tonsils are present. The mouth-breathing child is recognized by the irregularity of its teeth, the contracted upper jaw, the high vault, contracted nostrils indicate obstruction in the nasal passages. I frequently ask parents or guardians of children brought to me with contracted arches, "Have you had the adenoids taken out?" The answer is

yes, sometimes two or three times, and they are discouraged because the result is not more satisfactory. I suppose it is true that these adenoids are absorbed in time but the damage is done and the child has irregularity of the teeth. Often the upper jaw is so contracted that it is not in occlusion with the lower. The time to correct these irregularities is before puberty. It is unfortunate that so many cases of irregularity are permitted to go until the seventeenth or twentieth year, when the difficulties of correcting it are tenfold greater.

Dr. D. B. Pfeiffer: From the standpoint of the surgical pathologist I can recall a number of instances in which I have had the opportunity of examining the tonsils and the cervical glands removed simultaneously from the same case. A striking thing to me has been the inconspicuous character of the lesions in the tonsils as compared with the grave lesions in the glands. There are two reasons for this: (1) The glands are not usually removed until they show advanced lesions; (2) I believe we have to deal with essential differences in the tonsil and the glands. Of course the tonsil is a gland, but different in that it lies immediately beneath the surface. What is more important, it possesses sinuous channels, the crypts, which reach down into the depths. The tonsil has a ready means of recovery from the inflammation which attacks it. It is drained freely because of its proximity to the surface. It also has the power of passing on infection to the next door neighbor in the cervical chain. The cervical chain has no such ability and must deal with the infection that comes to it without the possibility of drainage. Therefore, inflammatory lesions do not attain the magnitude in the tonsils that they do in the cervical lymph nodes. In the crypts it is common to find cellular debris and bacteria. There need not be a great amount of hypertrophy or any striking superficial appearance and yet, in the depth of the tonsil there may be an area of ulceration with colonies of tubercle bacilli or other bacteria which gain entrance into the tissues, and by being superadded to an infection which at first was only hyperplastic may in time overpower the resistance of the glands and lead to a graver condition.

The paper of Dr. Stauffer points the way to reducing the number of recurrences after operation designed simply to remove the cervical glands already infected.

Dr. G. B. Wood: I am especially interested in a statement made by Dr. Pfeiffer, namely, that a small lesion in the tonsil may be associated with and be the cause of advanced changes in the cervical lymph nodes. I would go further and say that the majority of lesions in the tonsils which give rise to lymphatic or systemic infections are so minute that they cannot be detected by any known clinical method of examination. The tonsils seem to exercise some form of local resistance which prevents

the rapid development of infectious lesions. They may, however, transmit the infectious agents while the local lesion recovers or becomes encapsulated. For instance I found when experimenting with hogs that if the animal was killed in about twenty-eight days a virulent culture of tuberculosis bacilli had been rubbed on the surface of the tonsils, that the lymph nodes and tonsils showed about the same degree of pathologic changes. If the animal was permitted to live about five weeks or more it was noted that lymph nodes of the neck had practically been destroyed while the lesion of the tonsil showed little or no progress. The same is true of anthrax infection, namely, that it develops slowly as long as the lesion is limited to the tonsil itself. This resistance to the tonsillar tissue can be best explained by believing that there is developed in the tonsils a local immunity to bacterial invasion. The peculiar structure of the epithelial lining of the crypts permits the passage of inert foreign bodies and probably some of the pathogenic bacteria without visible changes in its structure. Certainly toxins elaborated in the crypts may pass to the parenchyma of the tonsil. The effect of this invasion is to bring about a localized immunity. In considering the question of the lymph nodules of the neck we have a very good clue to the source of the infection, in simply noting the position of the gland. The superior lymph nodes of the neck are arranged as an irregular collar and generally drain the area regionary to the particular node in question. In infection from the teeth we find that the posterior gland of the submaxillary group is first involved. When the infection comes from the fauces of the tonsil or base of the tongue we find the first adenopathy involvement in a gland of the deep cervical chain just behind and below the angle of the jaw. In infection of the nasopharynx or posterior part of the nose, the glands involved are the posterior pharyngeal and the posterior group of the deep cervicals. In infection arising from the external ear the mastoid node or the superior sternocleidomastoid gland is first involved, while infection arising from the posterior part of the head passes to the suboccipital group.

Concerning the possibility of a descending cervical adenopathy infecting the bronchial lymph nodes, anatomical research has shown that there is no connection between the cervical lymph nodes and the superior cervicular or bronchial glands. It is possible, however, for a tonsillar infection to reach the apices of the lung in certain cases where there is present an inconstant gland belonging to the deep cervical chain and situated at the angle formed by the junction of the subclavian or internal jugular vein. This gland is in very close relation to the apical pleura and when diseased may be direct continuity to structure involving the apex of the lung.

In my experimental work with tuberculosis I found that the only lesion of the lung resulting from tonsillar infection was a miliary tuberculosis developed late in the disease and due to the organisms having passed the barrier of the cervical lymphatics and entering the blood current.

Dr. George M. Dorrance: Dr. Stauffer makes the assertion that 75 per cent. of the cases of cervical adenitis disappear after the removal of the tonsils and adenoids. If the other causes such as pediculi or eczema of the scalp and abscess of root or carious teeth were also removed, the number of cases of recovery would be higher. Operation upon all cases of tubercular adenitis in my opinion is not advisable, as many disappear under tuberculin and rest. My practice is to *x*-ray all cases after removal of the cause of the enlargements. After my paper appeared in the *Penn. State Medical Journal* advocating this treatment many took exception to it, but it is gratifying to see that many advise *x*-ray to prevent recurrences after operations. Cases with sinus formation of course require a longer course of treatment. Whether the *x*-ray sterilizes the glands or destroys the food supply for the bacteria, I do not know.

Dr. Stauffer (closing): I am glad that Dr. Jopson and Dr. Darby agree with most of the points of this paper. I regret that I cannot agree with Dr. Dorrance's opinions that 75 per cent. of cases get cured without any sort of an operation. I believe that 75 per cent. of cervical adenitis cases are cured of their enlarged glands by the adenoid and tonsil operation and I refer to those cases in which the adenoids and tonsils were removed where enlarged glands were present at the time of the adenoid and tonsil operation. I am positive that if this method is tried as good results will be obtained as those which were obtained in my experience and I believe my colleagues in the hospital will substantiate my results. Of course Dr. Jopson sees the later stages of this disease and refers to those cases among children with great big glands with whom every sort of therapy has been tried and are brought to him as a last resort. Dr. Dorrance admits that therapy will not cure them. In regard to pus in the lung I believe that the day will come when with pus anywhere surgical measures will be used for its evacuation. Regarding Dr. Wood's statement, I believe the infection after leaving the tonsil gets to the lung by getting into the blood stream immediately from the innominate vein.

A STUDY OF 1000 CASES OF STAMMERING, WITH SPECIAL REFERENCE TO THE ETIOLOGY AND TREATMENT OF THE AFFECTION[1]

By G. HUDSON MAKUEN, M.D.

My clinic for defects of speech at the Philadelphia Polyclinic Hospital has been in operation for upwards of eighteen years, and this fact of itself may serve as a sufficient excuse for the presentation of a brief preliminary report of the work.

The clinic was the first of its kind in this country, and it has had in view two distinct objects: first, the careful study of those having defects of speech, and second, the establishment of suitable methods of treatment.

At no time has there been a dearth of material, for we have had an average attendance of about twenty-five, and a total of 2200 patients. Of these, 1050 had dyslalia, or stammered, and it is of these stammerers that this paper will treat, leaving the 1150 having other forms of defective speech, such as pseudolalia and alalia, for a future communication.

The points of special interest with reference to those who stammer have been the age, sex, temperament, mentality, general health, heredity, consanguinity, association with others similarly afflicted, conscious and unconscious imitation, nervous shock, as from fright or injury, condition of vision and audition, right- or left-handedness, peculiarities of writing, reading aloud, singing, and subjective and objective conditions of the nose, ears, throat and other organs of speech.

Read April 1, 1914.

Age. The age of the patients at the time of consultation was from two and a half to fifty-three years, the average being about fifteen. This average is considerably higher than that of the age of those in regular attendance, because of the occasional visits to the clinic of patients of somewhat advanced years, who soon grow weary of the work and give it up, realizing the truth of the old adage, "It is hard to teach an old dog new tricks."

Stammering belongs distinctively to childhood, although, strictly speaking, it must be regarded as an acquired affection. Thirty-eight per cent. of our cases claimed to have stammered always, but this, like so many other statements made in giving histories, should not be regarded as being entirely accurate.

The affection usually begins during the first few years of the developmental speech period, or to be more precise, it begins during the period of transition between the child's more or less meaningless jumble of words and his attempts to make accurate use of them as a means for the expression of thought and feeling. This period is that which comes between the ages of two and four or five, the exact time depending upon the state of the child's psychophysical development. It is rare for the affection to begin after puberty, for by that time the speech habits have become more or less fixed; but we have one patient who had no difficulty up to his twenty-third year, when the stammering began to manifest itself.

Sex. Of the 1050 cases of stammering, 77 per cent. were males, and 23 per cent. were females. This shows a greater proportion of females than statistics usually give. In my report of two hundred cases, published in 1897, only 5 per cent. were females. The high percentage here given may be due to the fact that clinic cases come largely from the working classes, and girls have more leisure and greater opportunities for taking up the task of seeking relief. However that may be, the affection is undoubtedly less prevalent in females than in males, and the reasons given for the difference have been many and varied, the chief one, I think, being the greater natural aptitude of females for all work requiring the finer coördination of muscles.

The female child begins to talk earlier than the male child, and, as is well known, she continues through life to evince greater aptitude and facility in oral expression. Aphasia is also less common in the female than in the male, and stammering is nothing more or less than a species of this condition. Both stammering and aphasia are undoubtedly of cerebral origin, and they are the results of either functional or organic disturbances of the cerebral speech centres, which centres by the way, always appear to be far more unstable and variable in the male than in the female. This tendency toward a greater variability of function in the male is more or less general and not altogether confined to the speech centres in the cerebral cortex. When stammering does occur in the female, however, the affection appears to be quite as severe, if not more so, than when it occurs in the male, and the same thing may also be said of aphasia.

Temperament. That stammering usually occurs in those exhibiting a somewhat characteristic temperament must be apparent to all who have made a careful study of the affection. Whether or not the temperamental peculiarities, however, are the cause or the result of the affection is another and more difficult question. As a rule, stammerers are emotional, sensitive, hesitating, evasive, and oftentimes cowardly. Fear is probably their most dominant characteristic, although one of our patients holds a Carnegie medal for risking his life to save that of another, and acts of physical bravery have not been uncommon.

The fear of the stammerer usually originates in his embarrassment at not being able to talk, and one who has not experienced the chagrin attendant upon the inability to perform this, in others, apparently simple psychophysical act can scarcely realize its full significance. To be suddenly stricken dumb when one is in full possession of his other faculties is an alarming predicament, and even a few repetitions of it will very naturally arouse a more or less overpowering feeling of fear in the afflicted individual.

One of my patients, himself a physician, claims that fear is the sole cause of stammering, and that the affection should be classed among the phobias. The fact is, however, that fear is

largely the result of the stammering, and it may afterward become in some cases a secondary causal factor, as it is certainly one of its severest complications.

While to some extent causal in its relation, therefore, the peculiar temperament of the stammerer is largely a natural consequence of the affection, and it increases with its duration. There is a progressive development of characteristics which combine to render stammering more or less a part of the physical and mental make-up of the individual. In a previous paper I distinguished between stammerers and those who stammer, the former being saturated, as it were, with the affection, while in the latter it only appears more or less as if by accident. To cure a stammerer requires a complete transformation of his temperamental characteristics, while one who stammers may be easily helped to overcome his difficulties.

Mentality. There is a popular belief that stammerers are mentally bright, and in certain respects this may be a true verdict, although there can scarcely be a greater handicap to normal mental development than the affection in question.

We have divided our cases into three classes: Class 1, containing those of average mentality; class 2, those slightly below the average; and class 3, those of distinctly feeble mentality. In class 1 we have placed 85 per cent. of the whole number; in class 2, 14 per cent.; and in class 3, 1 per cent. This means that 85 per cent. of the cases were of average mentality—and we have had few, if any, who might be regarded as being much above the average; about 14 per cent. were a little below the average mentality, and only about 1 per cent. were far below the average.

Thus it appears that stammering is of rare occurrence among those of feeble mind, a certain degree of intellectuality being necessary for the full development of the affection. The mentality of stammerers is not particularly characteristic of them except as it is the outgrowth of the affection itself. Some great men have stammered, but they have become great in spite of their stammering and because they have not allowed it to dominate their lives.

Moreover, men of strong mentality rarely continue to stammer for very long. They seem to be able to partially control their speech, and thus in a measure subdue the affection. Anatomically and physiologically, the central speech mechanisms are closely related to the higher intellectual centres of the brain, and they are under their direct supervision and influence, but not entirely under their volitional control. Speech is only a semivolitional act. Willing to speak merely sets into operation other complicated cerebral processes which finally lead up to the act itself, and any weakness in the chain of cerebral processes employed in speaking may result in some one or more of the various forms of defective speech. Scientific training tends to bring the processes of speech more and more under the control of the will, and therefore it should be employed as a prophylactic measure in those children showing a tendency toward faulty speech development, always remembering that in the affection under consideration, more than in most others, an ounce of prevention is worth more than the proverbial pound of cure.

The fact that about four-fifths of all stammerers are of average mentality and that only about one-fifth are below the average is worthy of note, and I would explain it on the theory that those who are mentally alert are under greater phonatory and articulatory stress. In other words, they have more to say, and they feel more the importance of saying it, than those in the lower grades of mentality. This explanation is rendered plausible because of the fact that difficulties of speech always increase with the desire to speak and with the necessity for speech. There are few stammerers who cannot swear fluently even when there seems to be no especial necessity or provocation for it. Simple expletives or humorous side remarks are also easily uttered, and it is the essential things in speech that appear to be difficult of expression.

General Health. The general health of stammerers is usually somewhat below par. Faulty breathing and spasmodic attempts at phonation and articulation combine to interfere with normal physical development. The acute infectious diseases, such as whooping cough, measles, scarlet fever, diphtheria, and

smallpox, are all important etiological factors in the affection. Moreover, stammerers are generally nervous and excitable, and they exhibit marked neurotic tendencies.

HEREDITY. The most important factor in the etiology of stammering is heredity, and this notwithstanding the fact that, as I have said, stammering is an acquired affection in the sense that speech itself is an acquired faculty. Heredity, however, must be held in great measure responsible for the various anomalies of the cortical speech mechanisms, which sooner or later give rise to the affection under consideration, and these anomalies are largely congenital and vary in degree all the way from the grosser, and it may be organic physical conditions of the brain, to the minor, and so far as we can determine, functional anomalies, which result in an instability or a weakness of the speech areas, with an ever-present tendency toward the development of the affection.

Thirty-nine per cent. of my patients admitted having or having had relatives who stammered, and this percentage is probably too low, because there is always a tendency to conceal the facts in matters of this sort, and because stammering probably existed in some of the families without the knowledge of the patients.

Stammering is an affection that develops with the development of the speech of the individual, and it develops chiefly in those children who have inherited, or it may be acquired, the physical anomalies which make the development of the affection possible or even probable. These anomalous cerebral conditions which give rise to stammering may be transmitted from parents who themselves may not have stammered, but who possessed all the cortical conditions which usually result in the affection and only escape it through more favorable environmental surroundings.

CONSANGUINITY. Twenty-nine of my patients, or 2.8 per cent. of the total number, were the offspring of consanguineous marriages; a fact which can have but little significance until we shall have compared this percentage with the percentage of stammerers occurring as a result of marriages between those having no blood relationship.

Association. Association with others similiarly afflicted and imitation, whether voluntary or involuntary, are undoubtedly factors in the etiology of stammering, but the difficulties of arriving at accurate statistics with reference to them are very great. Those who inherit the physical conditions which give rise to stammering are so frequently associated with those from whom they may be said to have inherited the affection that it is quite impossible to determine which of the two factors may have been in operation and which one may be etiologically paramount. Association and imitation, however, must be reckoned with in studying the etiology of stammering, and especially since they help to determine the character of the affection and thus suggest certain variations in the treatment indicated in individual cases.

Thirty-two per cent. of my patients confessed to have associated with others similarly afflicted, but in the majority of instances this association was with others in the family who, together with the patients, may have inherited the conditions which made the affection possible, or who were themselves blood relatives from whom they may be said to have inherited the affection.

Fright or Injury. Inasmuch as over 28 per cent. of my patients date the origin of the affection from the instant of having received a nervous shock, I think that we must give this a conspicuous place in the list of the causal factors of stammering. There is probably no human faculty that is so much influenced by nervous or emotional conditions as the faculty of speech. To such an extent is this true that one can immediately detect the various emotions such as joy, sorrow, and anger in the speech even of the normal individual, and it is not unusual for people to become quite speechless under nervous or emotional excitement.

In those whose stammering has been the direct result of a fright or injury, we must consider that the cerebral speech mechanisms have been temporarily thrown out of gear, so to speak, and that they have never righted themselves. Then, as a consequence of the speech disorder, anxiety, fear, and the various other concomitants of stammering arise to complicate the condition. In

this sense the nervous shock itself is only a secondary cause, the primary one being a weakness or instability of the cerebral speech areas, together with, in many instances, a more or less general neurotic or neuropathic condition.

Vision. Although not very careful studies of the ocular conditions were made, we found 26 per cent. had faulty vision, owing chiefly to a defective action of the muscles.

Audition. Only about 3 per cent. had subnormal hearing, and this seemed to be purely accidental and in no respect related to the affection. Neither a very great loss of hearing nor absolute deafness, congenital or otherwise, appears in our list of patients. This fact tends to substantiate the theory that stammering usually results primarily from a functional disturbance in the auditory region of the brain, and that it occurs mainly in the so-called "audito-moteurs," or those receiving their speech cues from both the auditory and motor centres.

Stammering in all probability is due primarily to a kind of amnesia or inability to mentally recall some particular portion of the word or syllable to be uttered, and as has been pointed out by a recent writer, himself a stammerer, it is generally the auditory image of the vowel element of the word or syllable that fails to be aroused, either consciously or unconsciously, in the mind of the individual. Moreover, it seems not to be the vowel element itself that is at fault in the stammerer, but the vowel coloring or inflection which appears exclusively in the language of speech in contradistinction to that of song.

The congenitally deaf who learn to speak orally do not develop the affection because they are dependent upon the visual and kinesthetic areas for their speech cues. Moreover, the congenitally deaf who learn to speak orally are usually under no special speech strain, and as pointed out by Gutzman, they learn to speak while they are learning to understand speech. They have, therefore, comparatively little to say, and they are specifically taught how to say it. That we may also have visual and kinesthetic amnesia is shown by the fact that stammering occasionally occurs in writing, piano-playing, and kindred processes.

Nose and Throat Conditions. Early in my studies of stammering I became so deeply impressed with the frequency of concomitant nose and throat affections that I thought there must be some etiological relations existing between them, and I have had no reason to change my mind, although I am not quite sure what these relations are. No less than 97 per cent. of my stammerers complained of some nose or throat trouble, and so great was it in 36.8 per cent. of them that operations were performed for their relief.

Over 37 per cent. had intranasal pressure, due to various irregularities of the nasal septum, and about 11 per cent. of them underwent operations. About 60 per cent. had diseased tonsils and adenoids, and operations were performed on nearly half of them.

In 1896 I reported the case of a child who suddenly ceased to stammer after the removal of an adenoid, and I thought I had made a great discovery, but further experience has led me to believe that the good results obtained in that single case were unusual and in the nature of a coincidence, although it is an interesting and striking fact that so large a percentage of stammerers have nasopharyngeal affections. As in the case with so many other causal factors suggesting themselves in this affection, however, it is quite impossible to determine whether it is the catarrhal conditions which cause the stammering, or whether the stammering causes the catarrhal conditions. The faulty methods of breathing and speaking in the stammerer undoubtedly tend to aggravate, if they do not cause, the numerous pathological conditions found in the nose and throat. At the same time any obstructions to normal breathing and speaking must be regarded as a possible secondary causal factor in the affection under consideration.

Treatment. From what has been said you will readily understand that the treatment of stammering is more psychological than physiological, and yet the psychical causes of stammering can only be reached and removed through the physical activities of the individual. The only way that one can learn to do things is

by doing them, and the only way that a child can learn to talk freely and unhesitatingly is by talking freely and unhesitatingly, and when he cannot do this, as is always the case with the untaught stammerer, he must be shown how to do it. This is the work of the teacher, but in order that the teacher may be able to do it successfully, he must himself be skilled, not only in the art of speech, but also in the art of teaching speech culture.

The successful treatment of stammering aims not to correct a defect of speech, but to establish good speech; not to graft something upon an old trunk, but to plant a new tree, and to encourage its growth. In other words, the treatment of stammering has for its purpose primarily the reëducation of the cerebral speech mechanisms, and this reëducation must be brought about largely through the accurate physiological use of the peripheral mechanisms of speech. The physical exercises must be selected and adapted to meet the needs of each individual patient, and they must be practised by the patient, not aimlessly, but with close attention and with what some one has called "purposeful intent." The chief purpose of the practice should be the establishment of normal mental imagery, for, upon the accuracy of the mental imagery depends the accuracy of speech. Just as one may by practise strengthen and develop his visual imagery and thus increase his powers of observation, so may the stammerer develop and strengthen his auditory imagery, and thus overcome his difficulties of speech.

The stammerer must learn to idealize speech just as the singer learns to idealize song. "As a man thinketh, so is he," is a phrase that suggests the condition of the stammerer. If he thinks stammering speech, he will necessarily use stammering speech. His condition is like that of a novice on a bicycle who sees a stone ahead. If he sees it clearly enough and to the exclusion of other things, he will surely hit it. On account of his past experiences the stammerer sees nothing but trouble ahead, and the fear of this trouble amounts in some instances to a veritable obsession, paralyzing all normal effort. Accurate mental imagery under such conditions is a practical impossibility, and we must help the

patient to remove the mental confusion arising from his fear of trouble before any satisfactory progress can be made. "Knowledge," says Emerson, "is the antidote to fear," and when the stammerer has acquired an adequate knowledge of the nature of his difficulties, he is then in a position to learn how to reintegrate and strengthen the mental imagery upon which good speech depends.

DISCUSSION

Dr. N. P. Stauffer: I should like to congratulate Dr. Makuen upon his success in the case of the young man who spoke last. I saw this case about a year ago and the patient has made a wonderful recovery.

MUNICIPAL SANITATION[1]

By M. N. BAKER

EDITOR ENGINEERING NEWS, NEW YORK CITY; PRESIDENT BOARD OF HEALTH, MONTCLAIR, NEW JERSEY

The subject of municipal sanitation is as broad as it is vital. It touches the citizen on every hand. It is a matter of life and death. All this is but little appreciated and less understood by the ordinary citizen. If he gives much attention to the matter this imaginary but yet very real person is confused by observing that newly learned facts and a better understanding of existing knowledge are constantly changing scientific conceptions of municipal sanitation. This tends strongly to render popular misconception of sanitation still more marked and thus to increase those obstacles to sanitary progress which arise from a confused, skeptical, and therefore unsympathetic public. Happily, there is good reason to believe that although details of both theory and practice will change in the future, as they have in the past, the fundamental basis of municipal sanitation is now thoroughly established. If this be true, the great task of the future will be educational, since progress in the application of the principles of sanitary science depends so very largely upon the moral and financial support of citizens and taxpayers.

The general public is, of course, made up of individuals. These have come to rely so largely upon members of the medical profession for guidance in the matter of private health that they naturally turn the same way for information and leadership in public health. This places a peculiar responsibility upon physicians, both individually and collectively, and is one of the reasons, I suppose,

[1] Read May 6, 1914.

why an old and honorable association like your own College of Physicians has a committee on public hygiene and devotes a part of an evening to municipal sanitation.

Before going further, a more concise definition of the subject on which I have been asked to speak seems desirable. Broadly, municipal sanitation embraces all those works or activities which it is the *duty* of the city to conduct or regulate in the interest of public health. Mark well the word *duty*, for in many of our cities there is a wide gap, yes, a truly awful chasm, between duty and performance in the field of municipal sanitation.

Municipal sanitation includes water-supply, milk and other food supplies, sewerage, garbage and refuse disposal, street cleaning, the regulation of buildings, and all that portion of city planning which has to do with the width and orientation of streets, and with the provision of transportation facilities which will assist in preventing, or at least reducing, congestion of population. In addition municipal sanitation embraces a variety of other activities, usually conducted or regulated by the health department and designed to prevent the spread of communicable diseases and to promote the general health of the community and of individuals.

Even if there were time to do so, it would be quite unnecessary for me to take up these various elements of municipal sanitation in detail before such an audience as this. Instead, I propose to dwell briefly upon a few important but too little considered phases of the subject.

First of all I wish to urge that although municipal sanitation embraces a great number and variety of matters affecting public health, not all of them affect it to the same degree, while some of them have more to do with other kinds of safety or with comfort or convenience, or with industry, or with commerce, than with public health. All these other concerns are rational and are essential to the city dwellers, but they should not be confused with public health, and both they and the unquestioned public health inquiries must be rated in the scale of relative values in order that each may be in a fair way to get its just share and no more of the municipal budget.

I mention this phase of my subject at the outset because one of the much neglected first principles of municipal administration is that consistent progress demands a clear conception of relative lines of municipal work, both between each great division of municipal concern and within the divisions themselves. This is essential to the formation and constant revision of a far-seeing municipal program—a line of endeavor too little followed by American cities as a class.

By a municipal program I mean not merely the planning of a city's activities for a single year but for many years to come, all with careful regard to the city's financial resources. Current practice in most American cities consists altogether too much of considering each division of municipal activity entirely by itself without regard to the other financial needs of the city. The result often is that the activity which has the most able orator, or whose administrative head has most political influence or backing, gets an undue share of the municipal funds, while other activities suffer accordingly.

How are we to measure relative values in the field of public sanitation? How indeed except by vital statistics, which for the present must be chiefly in terms of death-rate, both general and from specific diseases? With vital statistics as a standard, applied impartially and intelligently to the whole field, we soon find that many lines of endeavor classed as sanitary must seek their justification chiefly from serving other than health-protective functions. Even without vital statistics a close analysis of the cost of public water-supplies, for instance, will disclose the fact that essential as is pure water to health only a small part of the huge sums expended for water-supply goes to insure purity, the major part being laid out for quantity rather than quality, and to meet the demands of fire protection and business industry rather than domestic consumption. These other demands are legitimate, but the cost of meeting them must not be charged to municipal sanitation. Other large expenditures, such as those for the collection and disposal of garbage and refuse, have little measurable effect upon public health, although fully warranted as providing for comfort

and convenience. Sewerage systems have made possible the abolition of privies, cesspools, and infected wells, and have reduced the number of "typhoid flies," thus helping to lower the general and certain specific death-rates; but once this class of waste is removed from the vicinity of habitations its final means of disposal becomes chiefly a matter of the prevention of nuisance rather than a reduction of the death-rate. This runs counter to popular opinion, in so far as such opinion exists, and probably to the opinion of most members of the medical profession, but nevertheless the fact remains that where the pollution of public water-supplies by sewage is concerned it is water purification rather than sewage treatment which saves lives. It therefore follows that when the promotion of public health is being considered, far greater weight should be given to water purification than to sewage treatment. There can practically never be any question about this as regards the water-supply and sewage disposal of the same municipality. When the sewage of one city threatens the water-supply of another the case is different, but the fundamental principle remains unchanged: that is, the purification of the water-supply of the second community must be its chief safeguard rather than the treatment of the sewage of the first city. As a matter of pure economics, this may mean that the upstream city should contribute toward the expense of purifying the water-supply of the lower city rather than lay out much money for the treatment of its own sewage; or if the cities are near enough together it might mean that the two should join in the expense of carrying the sewage of the first city to a point below the water-works intake of the second. Or, again, it might even mean that the upstream city should contribute toward the expense of an entirely new source of water-supply for the downstream municipality.

The facts are that while water purification purifies, sewage purification does not, so far as the removal of the germs of communicable disease is concerned. Sewage purification is a misnomer. It is very unfortunate that the term ever came into use. It is true that a few sewage treatment plants do effect a very considerable degree of bacterial removal, and that the engineer

and the chemist working together can produce a sewage-works effluent containing very few bacteria of any sort—provided expense is disregarded. But this does not alter the facts, and as a rule it will be found cheaper to protect public water-supplies by water purification rather than by sewage treatment.

I am sure you will be interested and that most of you will be surprised to learn that scarcely a sewage-treatment plant throughout the world is being operated today for the purpose of bacterial reduction. Many such plants may have been installed for the more or less ostensible purpose of protecting public water-supplies, but practically all of them are being operated with the sole object of preventing nuisances in the way of unpleasant odors and sights.

Some of the foregoing remarks may sound like rank sanitary heresy, as until within a few years past would have sounded the assertion that air from unsound plumbing did not spread diphtheria and scarlet fever, bad air cause malaria, soiled clothing give rise to yellow fever. But apply the vital-statistics test in the light of sanitary science and it will clearly appear that odor and dirt may be nuisances without menacing health, and that chances of infection may be so slight in some quarters and in others so little reduced by practicable measures as to make the expenditure of money in other ways productive of far more benefit to public health than if spent for sewage purification, plumbing inspection and the abatement of a variety of minor nuisances which now takes up so much of the time and funds of many of the boards of health of the country.

The whole matter as thus far reviewed may be summed up by stating that a clear-cut distinction should be made between municipal health on the one hand, and municipal cleansing or some other form of decency or convenience on the other. Each class of work is legitimate and desirable, but public health needs are too many and great and municipal funds too limited as compared with the demands upon them to make any excuse for haziness on the subject of what may briefly be denominated, "what's what in public health work."

Local needs and abilities to meet them vary so greatly in different cities as to make desirable a comprehensive municipal

sanitary survey, and the framing of a carefully-thought-out sanitary program for each city. Such a program should fit into the broader program of the city as a whole and be given proper recognition in the yearly municipal budget. A consistent sanitary program and budget cannot be prepared without a proper system of sanitary and health accounting and statistics. To be of the highest use such a system must admit of ready comparison with the accounts and statistics of other cities. All this, or at least an adequate summary of public-health expenditures and several statistical forms, has been provided for by the United States Bureau of the Census. The Massachusetts Association of Boards of Health has drawn up a standard form for a health board report. The American Public Health Association and the Boston Society of Civil Engineers, and both the American and the New England Water Works Associations, have done considerable work along these lines. The latest report of the Board of Health of Newton, Mass., if I remember rightly, follows the general lines of the model report outlined by a committee of the Massachusetts Association of Boards of Health. In a modest way the Board of Health of Montclair, N. J., has for several years past tried to present a summary of its expenditures so as to show what part of its funds are spent for what I term direct health-protective work and what for work which, although having a much less direct effect upon public health or perhaps little or no effect at all, must for the present be conducted by the health boards of most of our cities or else remain undone.

Let us now consider briefly the place of the board or department of health in municipal sanitation. Twenty years' experience as a member of the Board of Health of Montclair, N. J., and twenty-seven years of editorial experience in the broad field of municipal health, sanitation and government, have led me to conclude that for the present the work of municipal boards of health should be confined almost wholly to direct measures for the control of communicable and perhaps occupational diseases, to the reduction of infant mortality extended to cover child hygiene, and to certain regulatory and educational work designed to promote general health.

So far as communicable diseases are concerned the motto of boards of health should be *control at the source,* which is of course the infected or infective individual.

Such a program would delegate to the engineering and public works departments of our cities, the various cleansing operations sometimes entrusted to health boards, such as garbage collection and disposal and street cleaning. It would also turn over plumbing inspection to the building departments.

The sanitary control of the milk supply is so important a matter, and has been so much neglected until very recently, that we may well dwell upon it for a moment. For a large city like Philadelphia, and in fact for most smaller cities down even to populations of 15,000 to 25,000 population, the sanitary control of the milk supply is a difficult and perplexing problem. Thorough control requires frequent inspection of milk production at its many sources, which range from scores to hundreds of miles away and for a large city are perhaps located in half a dozen different states. If all cities exercised proper control of their milk supplies, there would be a vast amount of duplication of inspection, with more or less conflict, or at least with irritation due to the different standards of different municipalities; and in any case there would be great economic waste. It is certainly pertinent to inquire whether a considerable amount of sanitary supervision of public milk supplies should not be conducted by the several states, and where interstate supplies are concerned by the Federal government. It is also pertinent to inquire whether in view of the expense and uncertainty of inspection of milk production at its sources, or perhaps as an additional precaution, the major part of the milk supply of our cities should not be pasteurized.

A word may be said as to professional education. Today we have more trained men available to design, build and operate sanitary works than to conduct what I like to call strictly health-protective functions. In other words, we have more trained sanitary engineers than trained health officers. It may be noted in passing that some of our best health officers are indeed engineers, as witness your own city of Philadelphia and my own town of Montclair. If all municipalities were to awake to their health

department needs tomorrow there would be an instant demand for hundreds of trained health officers with comparatively few men of proper education and experience to meet this demand.

I trust you will pardon me if I say that for many years I believed that our engineering schools far outdid our medical schools in offering the sort of training needed to make good health officers. I am still strongly inclined to that belief, but I now think that with a proper delimitation of the work of health departments so as to exclude all responsibility for the construction and operation of cleansing and other municipal work, which can best be intrusted to the engineer, and with the great improvements which have recently taken place in medical education, the medical rather than the engineering schools should be drawn upon for the vast majority of health officers; but the medical schools are not yet equipped and probably never will be equipped to give, or do medical students have time to take, all the instruction needed to make a good health officer. Moreover, private medical practice would not go far toward supplying the deficiency of the medical schools in public-health instruction, owing to the fact that public and private health problems are so utterly different as to make both medical education and professional practice entirely unsuitable as a preparation for the work of a health officer. On the other hand, the engineering schools are not prepared to give all that the heath officer needs. Besides, it is also true that the medical schools necessarily devote a large part of their time to subjects which can be of no possible use to the health officer.

Fortunately, a number of schools of public health have been started during the past few years which will meet in large measure the increasing demand for specific training to health officers. Unfortunately, it seems to me, most of these schools superimpose public health on medical education. Once there is a sufficient demand for trained health officers the candidate for the degree of public health ought not be be required to sacrifice the time demanded for a full medical course any more than for a full engineering course—although at present one or the other may be needed in order to insure a profession to fall back upon in case the uncertainties of municipal employment suddenly leave the health officer

without a position. It may be added that there are today engineers a plenty for the engineering work of cities and no lack of doctors for the strictly medical work that a city needs. The lack is for men trained somewhat in both professions, plus what the schools of either seldom give. A few institutions are offering courses in public health along national lines, so that the necessary training for a health officer may be secured without graduation from a medical school, but so far as I know the almost universal rule is to require a diploma in medicine before granting a full degree in public health.

Just as our cities find it necessary to exercise more or less control over many individuals, public-utility corporations and business firms in matters of public health and sanitation, so is it essential that there be some central administrative control of municipal health and sanitation. This is usually effected through a state board or department of health. Most of our states have thus far failed of their duty in this respect. Pennsylvania after many years of almost complete and quite shameful sanitary neglect suddenly came to the front a few years ago as a leader in state control of certain sanitary and health matters. It has accomplished much in this direction, and certainly deserves high credit.

Friends of municipal sanitation and state sanitary control outside the state feel some apprehension lest your State Department of Health is attempting to go too far and being too arbitary in its attempt to gain absolute control of the sewerage and sewage disposal of municipalities. To some outsiders it seems that sewage treatment in Pennsylvania is being exalted to a more important position than water purification, and that unnecessary burdens are being laid on some municipalities by requiring them to submit plans for sewage treatment works which are not so much needed as are other sanitary and municipal improvements. A more intimate knowledge of local conditions might change and might only confirm this opinion.

I have felt for some time that before the health department of any state demands a considerable expenditure for sewage treatment on the part of a city, the central authority really ought to make at least a general survey of all the sanitary needs of that

city, taking also into account its financial ability to provide for those needs. After such a survey the state department of health would be in a far better position to decide whether or not a city should be compelled to spend large sums for sewage treatment.

Take your own case here in Philadelphia. I understand that the city was ordered by the State Department of Health some years ago to submit plans for sewage treatment and that expensive and costly works to that end have been planned.

You are in better position than I to know how far the state and the city have gone in considering the relative need of these works and of other sanitary works and reforms.

In closing, permit me to call your attention to the fact that there are some phases of municipal administration which although not in themselves strictly of a sanitary character yet by indirect though certain means vitally affect the health of a city. To cite only a single instance, and that a local one: Philadelphia has long been notable if not notorious for its enormous so-called water consumption, which is really in large part waste. Failure to reduce this waste to what has been readily attained in other cities, and to what has been recommended again and again by successive chiefs of your bureau of water and by eminent consulting engineers from other cities, has made necessary the expenditure of millions to build and many thousands to maintain and operate works to filter vast quantities of water only to be wasted, besides which other portions of your water-works have thus been made unnecessarily costly to build and maintain. Because of this useless water waste your filtration works are severely overtaxed at times, with more or less danger of imperfect filtration and resulting water infection. Had the water waste been curtailed years ago, as advised, the whole city might have been more speedily supplied with filtered water, much sickness averted, many lives saved, and large sums of money rendered available for health-protective work. Your organization has a fine opportunity to create a sound public opinion on this subject which will back up your Water Bureau and other city authorities in attempts to introduce meters —the only effective means of reducing water waste and the fairest basis of distributing the cost of water among its consumers.

THE ORGANIZATION OF THE BUREAU OF CHILD HYGIENE OF THE DEPARTMENT OF HEALTH OF NEW YORK CITY, AND ITS RESULTS[1]

By S. JOSEPHINE BAKER, M.D.
DIRECTOR OF BUREAU OF CHILD HYGIENE, DEPARTMENT OF HEALTH, NEW YORK CITY

The organization of a Bureau of Child Hygiene by the Department of Health of New York City in 1908 was a direct result of the changing concept of the city's responsibility in relation to the health of its citizens. The evolution of New York City's Health Department and that of many other cities shows certain well-defined periods of health activities, each differing from the preceding in a marked degree and reflecting the trend of medical opinion of the same period. Up to the middle of the last century, illness was considered as a purely individual or personal matter, to be cared for by the private physician, the community's responsibility being considered as a negligible factor. Sanitation and hygiene bore a purely academic relation to individual illness as far as civic authorities were concerned. The exigencies of commerce caused the first marked change in this attitude. Cholera has been aptly called "the best lobbyist for public health funds that any city has had," for it was the sweeping epidemics of this disease that first called attention to the need of adequate quarantine regulations and the necessity of community action in our seaport towns in safeguarding health Quarantine marked the demarcation of our "let-alone" policy in health matters and the following repressive period. During the plague, merchants were the vigorous class in demanding that proper precautions be taken to enforce

[1] Read May 6, 1914.

sanitary conditions. Prolonged quarantine meant then, as it does today, a serious interference with business, particularly where importing and exporting are concerned, and money was appropriated by force of public opinion, so that healthful conditions might be restored at the earliest possible moment, and commerce be again unrestricted.

The third or corrective phase of health work still obtains in a greater or less degree in all communities. This attitude on the part of health boards may be described as the exercise of their broad police powers in correcting conditions of ill-health or lack of sanitation, after they have been found to exist. For many years, health boards were all organized on this principle and felt that their full duty was performed in the isolation of cases of contagious diseases and the correction of violations of ordinances relating to the sanitation of buildings and land. Such corrective measures have been, and always will be, unsatisfactory. They are not based upon any constructive program for the ultimate health betterment of a community. At their best they have had little lasting influence upon morbidity or mortality, and have served rather to cover up the absence of progress by a showy attempt to impress the public that something is being done. It is true that corrective measures will be essential in public health work for many years, but no community can hope that this attitude alone will solve its problem of a high morbidity or mortality rate. At the end of the last century the fourth marked change in public health work was manifested, and in line with the awakening of the medical field to the importance of prophylaxis and the development of preventive medicine came the educational aspect of public health activities. The attempt to solve the problem of tuberculosis was the first step taken in this direction. It was the first conscious recognition that education of the individual in wholesome living was a vital factor in sanitary progress. The betterment of living conditions, the direct responsibility of the community toward the housing problem, toward congestion of population, the assimilation of alien races, the living wage, the importance of pure water, milk, food, and uncontaminated air are, from the point of view

of the sanitary authorities, almost direct outcomes of modern bacteriological research in relation to the problem of the elimination of tuberculosis, but, in a larger way, they have resulted in an awakening of a social conscience and an entire evolution in public health work. It is this educational aspect, and the full recognition of the importance of preventive health work in its highest meaning, that has led naturally to its most important expression—the conservation of the health and life of the child.

As New York City was the first community to take cognizance of the importance of child welfare work, from the point of view of the Department of Health, it is interesting to trace the development of the attempt to work out a logical system for effective work.

The Bureau of Child Hygiene was organized late in 1908 as a division of the Sanitary Bureau. At that time the main activity of the department in relation to children's health consisted in the medical inspection of school children, carried on in a rather restricted form, with particular reference to control of contagious disease. The new bureau therefore started with this one phase of child work. It was found possible to develop this particular activity by broadening its scope so as to include not only the physical examination of the school children, but the educational work of the trained nurse, which made it possible to secure proper treatment for the great majority of the children who were found to have some neglected physical defect.

In accordance with the idea which lay back of the organization of this Bureau, that the main work was the prevention of disease and the education of the public to do its share as rapidly as possible all activities relating to the health of children were coördinated and placed under the bureau's control.

The work at present starts with the prenatal care of the child by means of definite instruction to expectant mothers concerning the care of their own health and the use of all social agencies to make this effective. The work has been carried on for less than a year. It is therefore too early to state just what its effect may be. It is a known fact, however, that nearly 40 per cent. of the

total mortality under one year of age occurs during the first month of life and that the greater part of this mortality can be classified as congenital, including deaths due to accidents or injuries of childbirth or to diseases directly dependent upon the health of the mother. It is therefore essential that in any broad scheme to reduce infant mortality the health of the expectant mother must be considered as a very important factor. From intensive studies made it is probable that this prenatal work, carried on as it is now, on a purely preventive and fairly extensive scale throughout the city, will have a distinct influence in lessening the number of infant deaths.

The control of the midwife situation, following as the next logical step, has been one of difficulty. There is a marked difference of opinion on the subject of the right of the midwife to exist. While there may be an honest difference of opinion as to whether or not a midwife should be allowed to practise in a locality where she has hitherto not been needed, there can be little difference of opinion as to the need of the sanitary authorities of any community exercising some method of supervision over the midwives who are already practising. In our large cities the midwife seems to be an established and necessary part of our alien population. The habits of a large proportion of this population are such as to make them demand the midwife. The Bureau of Child Hygiene has felt that the unsupervised, uneducated midwife, even at her best, is a distinct source of danger. In order to protect the mothers and the babies the midwife must be subject to some definite control. In New York City these women report over 40 per cent. of the births. The Bureau of Child Hygiene has kept them under supervision, licensing each one annually, after investigation, and revoking the licenses for any violation of the rules and regulations of the department. While there can be no question that during the past five years the status of the midwife in New York City has vastly improved, the bureau did not feel that mere supervision was the full remedy, and after many conferences and a thorough survey of the situation, Bellevue Hospital established as a part of its work a School for Midwives, with a six months'

resident course. The Bureau of Child Hygiene thereupon recommended to the Board of Health that a resolution be passed, prohibiting any midwife who had not previously practised from doing so after January 1, 1914, unless she had received a diploma from a school for midwives recognized by the Board of Health. So far the School for Midwives at Bellevue Hospital is the only one which provides the curriculum which we think desirable. Ophthalmia neonatorum has practically disappeared in New York City. A thorough investigation has shown that for the past five years only twelve cases of blindness from this disease have occurred in the babies born in New York. Not only are the midwives required to use the silver nitrate solution, but they are required to report all cases of sore eyes at once. In each such case an ophthalmologist is sent to visit the patient and to keep in touch with the case until appropriate treatment is provided. Thereafter a nurse visits the case to see that the treatment is adequately carried out. Puerperal septicemia has definitely diminished in the midwives' practice. In fact, in proportion to the number of births it is now found more frequently in the practice of the physicians of the city. While the problem of the midwife has not been solved, it is in no way so serious a problem as it was some years ago. The midwives themselves are coöperating with the department by furnishing us with the names of prospective mothers, so that they may be given prenatal instruction, and they have shown themselves willing and anxious at all times to conform as nearly as possible to the rules and regulations of the department.

The reduction of infant mortality is, of course, closely allied to the subjects that we have already discussed and to the further proposition of the care of the foundling baby. The Bureau of Child Hygiene has, so far as the city is concerned, full control of the methods which are needed to reduce the mortality of infants. New York has been particularly fortunate in its budget appropriation for this purpose and in the spirit and enthusiasm of its workers. The use of the district nurse to visit babies as soon as possible after birth has been reported to the department, to instruct the mother in proper baby care, and to make use of all available

social agencies to keep the case under supervision as long as necessary, is one of the most important methods we use. Last year about 16,000 babies were under the care of these nurses, with a mortality of 1.4 per cent. The infants' milk stations, of which there are fifty-five, cared for about 40,000 babies during 1913. Here the mortality was slightly higher—2.5 per cent.—due to the fact that many sick babies were brought to the stations, but even this mortality is less than one-quarter of the average infant mortality of the city. There were 135,000 babies born in New York City last year. Of this number practically 60,000 came, in one way or another, under the control of the Department of Health. Possibly 10,000 more were cared for by the private agencies. In my opinion there are probably about 5000 babies who at present are not cared for and whose mothers need the kind of instruction that we can give, but we hope within the next year to have so extensive an equipment that no baby will be neglected.

Educational publicity, through the newspapers and by means of literature, have been widely used in this work, and the instruction of groups of girls over twelve in the care of babies, under the organization of the Little Mothers' Leagues, has been one of the most valuable factors of the work. The point of attack has been the well baby. The force of our efforts has been expended in keeping the well baby well. Cases of sickness are referred to physicians or dispensaries.

In order that the fullest efficiency might result, two years ago a definite effort was made to obtain better coöperation between all organizations in the city interested in infant welfare, with the result that we now have a Babies' Welfare Association, which is a federation of these allied agencies, about eighty in number. Effective coöperation has been obtained through a central office, with an executive secretary, and the work of saving babies has received not only a marked impetus, but also has been distinctly more efficient since this organization was effected.

Since the organization of the Bureau of Child Hygiene the death-rate of babies under one year of age has been reduced from 144 per thousand births in 1907 to 101.9 in 1913. Of the ten largest

cities in the United States, New York now ranks second in its low rate of infant mortality, being outdistanced only by St. Louis, with its rate of 99.5. Without prejudice it may be said that even St. Louis, large city though it is, can hardly be considered comparable with New York in the matter of the complexity and size of its health problem. The other eight of the ten largest cities of the country rank as follows:

Boston	107.0
Philadelphia	112.7
Chicago	118.6
Pittsburg	127.2
Detroit	132.7
Buffalo	137.4
Cleveland	145.7
Baltimore	159.6

An interesting fact about the reduction of infant mortality in New York City is that during 1913 its infant death-rate was less than that of any first or second class city in New York State except Rochester, and also less than the general average of all the third class cities or rural communities. The infant death-rate of New York City was 101.9. The infant death-rate for the remainder of the State was 120. Definite inquiries and intensive surveys have shown us that this reduction can be traced directly to the work that the Bureau of Child Hygiene and the allied agencies have done. It is a record which naturally encourages us, but with which we are not yet fully satisfied. While it is probable that our big cities may never have as low an infant death-rate as may be obtained in well-supervised rural communities or in a new, vigorous country such as New Zealand, still it will be possible, if the interest and money are available, to make a still further reduction.

I have spoken briefly of the foundling baby. The Bureau of Child Hygiene controls this matter by supervision of the homes in which these children are boarded out from the big foundling asylums. There are about four thousand such permits now in force. The mortality among the infants in these institutions is abnormally high, ranging from 50 to 60 per cent. during the entire year. There has been no decrease in the mortality in these insti-

tution babies for many years, and they may be considered as furnishing a fixed factor which acts as a bar to the reduction of infant mortality in a city like New York. It is to be hoped that the boarding-out system may become more extensive and that the institutions in the future will be used only as clearing houses. Institutionalism is a definite cause of death, as far as babies are concerned, and it will persist, of course, until a definite change is made in the policy of the city with regard to the conduct of such institutions.

The Infants' Milk Stations, of which there are fifty-five, serve more or less as health centres for the care of the child of pre-school age, that is, from two to five years. So far as I know, no country has been able to solve the problem of the health supervision of children at this period. We do not feel that we have solved it either, but we are making a definite attempt to reach the children of the city before they go to school, to carry them through this trying period under the best possible auspices, and to prevent or correct any physical defects before the school age is reached. I believe there are great possibilities in this work, and it is the intention of the Bureau to develop it to the fullest extent.

The day nurseries and orphan asylums of the city are under the hygienic control of the Bureau of Child Hygiene. In the orphan asylums we not only carry on a system of strict supervision over the sanitation, hygiene, daily routine, and all matters pertaining to the health of the children, including their food and play, but also each child in the institution is given the same kind of physical examination, with the same attention to treatment, as is given to the children in the public schools; 35,000 such children have been examined in the first year, and the majority of them given adequate treatment. The day nurseries are maintained under definite rules and regulations, which tend not only to safeguard the individual child, but also has practically eliminated the danger of the spread of infection in these places.

All of these activities may be said to cover partly the pre-school and partly the post-school age, but the main care of the child from five to fifteen years naturally falls within the work which is

known as the medical inspection and examination of school children. This title, I believe, is a misnomer, and in my opinion should be changed to "health supervision of children of school age."

In New York City we have 825,000 children in our public and parochial schools. Our system calls for a visit to each school each day by either a doctor or a nurse, except in a few outlying districts where visits are made at less frequent intervals. The objects are the control of contagious diseases and the prevention of physical defects or the detection and correction of such defects if they already exist. To attempt a description of this work within the limits of the time at my disposal is not practicable. It may be stated, however, that we have found it possible with our methods for the control of contagious disease to materially reduce the number of cases encountered, and since the organization of the Bureau of Child Hygiene it has not been necessary to close any public school in New York City because of an epidemic of contagious disease. Our methods are those of prevention, with the exclusions from school of any child who presents any of the premonitory symptoms of a contagious illness. It is our belief that it is better for a child who is not ill to miss a day or two of schooling than that an entire class should become infected. However, experience has made recognition of these cases sufficiently easy so that nearly 90 per cent. of all children excluded are found to have a definite contagious disease. Each child excluded is visited within twenty-four hours by a diagnostician, who confirms the tentative diagnosis. Whenever more than two cases of any one contagious disease occur in children attending the same class-room a daily inspection is made of each child until the period of incubation of the last case has passed. Where the disease is diphtheria, if two or more cases occur, trial cultures are taken from the throat of each child in the class-room, and any child found to have bacteria, even if no general symptoms are present, is excluded from school.

The contagious eye and skin diseases show an even more marked reduction as a result of this system of inspection. From 57,655

exclusions for this cause in 1903 the work has progressed until, in 1913, it was necessary to exclude only 4838 children for this reason. This result has been due definitely to the work of the school nurse and the method of treating in the school building minor cases of these conditions. In the most congested parts of New York at the present time it is difficult to discover cases of ringworm, scabies, or impetigo. Trachoma has been reduced from 20 per cent. to 3 per cent. Pediculosis, the most persistent condition we find, occurs practically as frequently as it did five years ago, but the cases are much less severe and live pediculi are rarely seen. The occurrence of physical defects of school children has also shown a marked reduction. In 1909, 13.1 per cent. of the children examined had defective vision, while in 1913 this rate was reduced to 8.5 per cent. The number of children suffering from defective nasal breathing has decreased from 18.7 per cent. in 1909 to 8.9 per cent. in 1913, while hypertrophied tonsils, though found in 22 per cent. of the cases in 1909, occurred in only 11.3 per cent. of the cases in 1913. The average percentage of children obtaining treatment as a result of the educational efforts of the school nurses is about 80 per cent. of those found to have defects. There is no compulsory treatment law in New York State, and wherever children are treated it is entirely through the parents' efforts. Practically 52 per cent. of the children who obtain treatment do so from private physicians, the remaining 48 per cent. going to the dispensaries of the city. The main part of the work of the nurse, however, is in visiting homes and in educating the parents as to the need of maintaining the conditions which will prevent ill-health in their children. The clinical facilities in New York City are fairly good in certain boroughs. In some boroughs, however, there are areas in which there are no dispensaries, and the Department of Health has found it necessary to establish eleven clinics for school children. In five of these a hospital service is carried out, with operations for removal of adenoids and tonsils. These operations are done under gas and ether anesthesia, and the children are kept in the hospital at least thirty-six hours. A refraction service, a service for contagious eye dis-

ease, and a dental service complete the equipment. The facilities for free dental treatment in New York City are totally inadequate and the dental service does not meet more than a very small part of the need.

One of the first matters which the clinics demonstrated was the need of full anesthesia in operations for the removal of adenoids and tonsils. From our experience it had been found that children operated upon for this reason in dispensaries not only suffered severe nervous shock, but in the majority of instances the operation was imperfectly performed owing to the struggles of the child. In addition, there was in several instances a secondary hemorrhage or a septic infection of the throat. After the children's clinics had demonstrated the need of regarding this as a definite operation and had conferred with the Association of Out-patient Clinics of the city, the latter decided to recommend to all clinics within its membership that operations for removal of adenoids and tonsils in dispensaries and without general anesthesia should cease. At the present time this action has been very generally followed and in only a few minor instances are such operations performed in dispensaries at the present time.

Special studies regarding the defective child, coöperation with the school lunch committee, and sanitary surveys of the schools to determine the need of adjustment of unhygienic and insanitary conditions are part of the activities of the bureau. The elimination of the common drinking cup and the common towel have undoubtedly resulted in lessening the spread of infection. Adequate systems of ventilation have not yet been put into effect in the New York City schools, this matter being under the control of the Board of Education. It seems illogical that schools should pride themselves upon open-air classes and definitely recognize the value of fresh air in individual instances, while continuing to deny even the simplest method of adequate ventilation in the ordinary class-room. It is to be hoped that all schools will, within the very near future, recognize the value of the open-window class and the necessity of fresh air as a means to promote mental alertness as well as physical health.

The enforcement of that part of the child labor law which relates to the issuance of employment certificates falls naturally as the last of the Bureau's activities, covering as it does the period between the ages of fourteen and sixteen years. While recognizing the necessity of adequate age and school records, the Bureau of Child Hygiene feels that, this being established, its main duty is in regard to the health of the applicant. For this reason each child is given a thorough physical examination and its physical record is made a part of the application. If a child is suffering from any physical defect which is permannt ien its nature the application is refused outright. When the condition is such that it may be remedied by appropriate care and treatment, such as defective eyesight, the occlusion of nasal breathing, malnutrition, or anemia the children are referred to the school nurse of the district in which they live. The nurse keeps them under observation, making arrangements for operations, medical care or outings, or such relief as may be necessary to restore them to health. The results have been excellent, and while, in our opinion, a large number of these children should not go to work because of the possibility of their ill-health returning, the nurses' efforts have resulted in a marked improvement in their general health. The year previous to the organization of the Bureau of Child Hygiene but one child was refused an employment certificate because of physical disability. Last year practically six hundred were refused outright and nearly double that number had their applications held pending their obtaining the necessary medical or surgical care in order to place them in good health. There is great doubt of the wisdom of allowing any children to go to work, but there can be no doubt that, where we do allow them to work, it is the duty of the community to see that they are physically fitted to do so, in order that any work they may perform may not react injuriously upon them at this most important stage in their development.

This outline of the Bureau's activities has necessarily been given in a somewhat sketchy form. The Bureau itself has 705 employees, including physicians and nurses. Its budget appropriation for 1913 was $652,000. It is the youngest Bureau of the

Department of Health, and at the same time the largest. The results of its five years' work have shown conclusively that it is possible for any community to have a constructive program for the health of children, that such a program must be founded upon the idea of educational hygiene in preventive medicine in order to be effective. Such a bureau is the highest type of this new relation between health boards and the public. Properly organized, such a bureau will demonstrate the full value of the money expended in its maintenance. In New York City our Board of Health has as a motto: "Public health is purchasable. Within natural limitations a community can determine its own death-rate." In no one of the department's activities is the truth of this saying more clearly shown than in the Bureau of Child Hygiene. In educational work of this nature it is necessary to recognize that the problem is largely a social one. It is interwoven with the economic and industrial as well as with the medical aspects of our community life. We have in the children the most plastic part of our population. We have in them potential possibilities which may be easily guided and directed. There can be no doubt that proper attention to the health of children will lessen adult ill-health. The person who passes through the period of infancy and childhood and, finally, puberty in physically sound condition has little to fear as to the development of those diseases which are dependent upon lack of resistance in the individual. Tuberculosis may be almost definitely eliminated by more attention to the question of health during the period of infancy and childhood. It has been practically demonstrated that tuberculosis is rarely if ever acquired during adult life, but that it is acquired and remains latent during the period of infancy and childhood. Robust health during this period is the great preventive. This argument is equally true with regard to practically all disease, and no community can invest an equal sum of money in any line of health work with so much certainty of good returns as it can in that money which is invested in carrying out a definitely constructive program in relation to the conservation of child life and health.

DISCUSSION

Dr. Joseph S. Neff: I do sincerely hope and trust that these papers will interest the medical profession of Philadelphia to such a degree that we shall wake up in this town and take the place we should have taken before this. We have no right to have in Philadelphia a higher mortality than New York, especially an infant mortality. New York is much more severely handicapped than Philadelphia with its miles of tenement house districts and its foreign population, and yet we see that New York has outstripped us. The trouble is a political one and due to the method in which the public health officers are elected. A public health officer should be trained for work and not appointed by the dictates of any political party. Thank Heaven there are some cities free from the latter method, and that some are freeing themselves. The baby-saving work done in Philadelphia in the past six or seven years is well known. The Health Department of New York has carried a budget of $652,000; one-half as much more than is appropriated in Philadelphia for the entire health work, including the maintenance of the Municipal Hospital. Dr. Baker did not tell you that over $228,000 which New York receives out of the $652,000 is for what we would call here "baby-saving" work. In Philadelphia, taking in the entire baby-saving work, is $20,000. We should have 48 nurses and 15 doctors to compare favorably in our equipment with New York. In 1908, Dr. Baker said they started their aggressive work. Before that New York's death-rate was 146 to ours of 133. When we got the appropriation for our nine men we confined their energies to a certain district in order to compare conditions with other districts and to secure material for presentation to our legislative body. The district in which they worked gave a lower mortality than the rest of the city. If we had the equipment of New York, we would save over 2000 lives in a year. The medical profession of New York had much to do with the work there. Far be it from me to criticise the medical profession of Philadelphia, for I should be an ingrate indeed. Whatever the Department of Health has been able to accomplish has been largely due to the loyal support of the medical profession given to the head of that department. My only desire is to inspire you to further effort. Look over the history of this College and see the position it took in public health affairs nearly a century ago. To-night's meeting is organized under the direction of your able Health Committee. Several years ago the College and the County Medical Society organized public health committees to get back of your health officers and to go before legislative bodies to aid in securing appropriations. The New York Academy of

Medicine has a Health Committee which has been in existence for a number of years. They have executive officers, stenographers, and I do not know what the Academy pays toward their support. I do know that they are the recipients of large sums of money and that they have done yeoman service. They study the health problem and ask for money needed. It is the thorough coöperation of the medical profession of New York that has formed an important factor in organizing the Bureau of Child Hygiene. My effort is to solicit your coöperation with the new Director of Health and your Vice-President, Dr. Harte.

Dr. A. C. Abbott: Mr. President and Fellows of the College: I do not believe that those of us living in Philadelphia realize what it has meant for New York City to accomplish the results that have been laid before us. In that city there is an area more densely populated than any other known spot on earth, and in twenty-six years there has been a reduction of mortality among children under one year of age of over 50 per cent. Twenty-six years ago the mortality in New York City of children under one year of age was 244 per thousand of children born. The latest figure that I saw was 112. Think of what that means in a city with congestion almost unique in particular localities, and a cosmopolitan condition such as no other city knows. They are far ahead of us in New York on the matter of saving infant life.

We are glad to be told that good health is purchasable. But when one decides to purchase a thing or a condition one must not have in mind the purchasing of all outdoors. One should contemplate that which can be paid for. Mr. Baker in his paper has clearly indicated this idea. In the majority of communities of from two to ten thousand the great question is the prevention of illness. This is the function of our health authorities and should come first. It is not necessary to make new discoveries; the energetic use of what we know, will result in a reduction of sickness and death, without a doubt.

The activities of our health boards in matters of general sanitation, such for instance as street cleaning and sewage purification, are diverting energies from the more important phase of health work. For over fifty years the public has been taught that it is safer and more agreeable to live under cleanly surroundings than otherwise, and unless such surroundings be supplied the public is apt to be heard from. In preventing disease and lessening death, the recognition of the possibilities is relatively modern and such functions should be emphasized as the most important of those performed by our responsible health organizations.

In the matter of purification of sewage, we have an enormously expensive task if it be carried to the ideals advanced by some of our enthusiastic advocates. A moderate degree of purification costing a great deal

less and thereby leaving more funds for real health work would meet all demands. Where sewage so purified is released into waters subsequently to be used for domestic purposes it is cheaper to install adequate means for purifying the water than to completely purify the sewage.

Mention has been made of the need for experts in the several phases of the health problem. I am much interested in that subject. At the University of Pennsylvania, we have been offering instruction in Public Hygiene since 1906. Our effort is not to train specialists, but rather to give to the student a comprehensive understanding of the many-sided problem. Whether or not our plan is the best cannot now be said. It is significant of the spirit of the times that several other important educational institutions are also offering instruction in problems of public health significance.

I think it desirable that a health officer should have a medical training because he is dependent upon the professional men of the community for support and he is much more apt to get it if he has had medical training and is in sympathy with medical ideals. The man who has had, in addition to medical training, special instruction in public hygiene, is a much better health officer than he who has not. I do not believe that simply because a man has a medical degree he is therefore a good health officer. Public health is a very many-sided question, and the day is past in which we can say, this is a good doctor, and therefore a good health officer. That is nonsense.

I am delighted to have heard both of these papers. As I said before, I take off my hat to New York City for its excellent work in saving infant life.

Mr. Alexander M. Wilson: This has been the most inspiring meeting on the subject of hygiene that I have attended since I came to Philadelphia. We have heard from Dr. Josephine Baker of a very practical way to save human life at relatively little cost. The great expenditure of money to which Pennsylvania is committed, on the other hand, does not promise to save life in anything like the degree that Dr. Baker has outlined. I refer to the scheme to make potable the running waters throughout the State, referred to by Mr. Baker. The cities of the State of Pennsylvania are now being compelled to install sewage disposal plants with this end in view. Soon Philadelphia will begin such an installation under order from the State Health Department at a cost of twenty to thirty millions of dollars. I submit to you that we are barking up the wrong tree. There have been few lives lost through drinking water from the Torresdale filter plant. It is true typhoid occurred last summer among people who drank the Torresdale water, but it was conclusively shown to be due to water forced into the service mains direct from the river by certain manufacturing plants. To install

a system of sewage disposal in Philadelphia will have little, if any, effect on the health of the city, while no other community in the state will benefit save Chester. It would be cheaper to give water to Chester from the Philadelphia supply than to make the Delaware potable for her sake.

I think if this meeting could only result in a clear conception of the relative advantages of the two health measures, child hygiene and sewage disposal, and if those here present would exert their influence in favor of the early adoption of the better plan, that it will have been one of the most useful meetings the College has ever held.

Dr. Walter S. Cornell: I am afraid that I am out of fashion when I say that I am not convinced that the water supply is the only factor in sanitation aside from the question of flies and cesspools. We should not forget the epidemics of scarlet and typhoid fever carried by milk. Diphtheria is essentially a disease of poor sanitation and its incidence appears to depend on the condition of the nose and throat, the crowding and the amount of dirt and filth in and around the house. District medical inspectors are familiar with the experience of finding the diphtheria house to be the dirtiest house in the block, tumble-down, needing paint, and often situated next to a side alley or with a cesspool in the rear. In 1905, I published in the New York Medical Journal a paper on the relation of sanitation to diphtheria in which I think it was demonstrated that poor sanitation, meaning particularly cesspools, are peculiarly associated with diphtheria. This paper was unfortunately given an ambiguous title (A Study of Contagion), and consequently never received the attention that it might have received.

Sanitary conditions in the schools of Philadelphia are in a general way good. In the new buildings they are excellent. In the old buildings, however, particularly some thirty rented buildings, conditions are fair or actually poor. Speaking as a physician, I would rather see our old buildings renovated than new ones constructed, even though some children are kept on half-time a year or two longer. Regarding the backing of the medical profession, I would say that it has certainly been friendly to the work of school inspection during the last two years and I take this opportunity to express my appreciation.

Dr. Baker (closing): I wish to refer to Dr. Neff's remarks about getting money for this work. When the Bureau of Child Hygiene was established there was no specific appropriation for infant mortality work. In order that this work might be done, I used the school doctors and school nurses during the summer vacation, and by conferences with the mothers and home visits to instruct them in methods of keeping the babies well, we were able to show a greatly lessened infant mortality. After this demonstration of the value of preventive measures, an appro-

priation was made for fifteen infants' milk stations. It has been my experience that when definite results can be shown from any definite line of work, particularly when intensive studies are made in certain sections of the city, it has not been difficult to get the necessary money to carry out the work.

In regard to publicity and coöperation: We have not hesitated to use publicity in New York City. We have taken the public into our confidence. It has also been possible for us to get extended coöperation from the allied agencies that are interested in baby-welfare work. I believe that there is a possibility that next year we may get a much larger appropriation for our school work. It should be emphasized that, in school medical inspection, probably the most important part is the educational work done by the nurses in the homes. Unless we can bring the message of proper hygiene into the homes of the children, we cannot accomplish much in any system of school medical inspection. I believe the trained nurse is the most important factor in public health work. Dr. Neff is right in saying that Philadelphia should have a lower mortality rate than New York. The whole question is largely one of money which usually can be obtained only by arousing public opinion as to its necessity. I hope Philadelphia will get the money it desires to carry on this work, and that its infant mortality rate will fall where it properly belongs.

THE DEVELOPMENT OF THE TUBERCULOSIS CAMPAIGN IN PENNSYLVANIA, WITH A DISCUSSION OF ITS PRINCIPLES[1]

By ALBERT PHILIP FRANCINE, A.M., M.D.

The development of the antituberculosis movement in Pennsylvania began in Philadelphia in the decade following the discovery of the tubercle bacilli in 1882, and may be considered to have passed through three successive phases or stages. The first consisted in pioneer effort to arouse the public and the profession itself to a sense of the importance and extent of this great scourge, its economic position as a destroyer of human life, its relation to domestic and community assets, and the possibility of its eventual control. That epoch-making discovery furnished a scientific basis upon which to proceed, and gave the needed impetus to the propaganda of education which in the two succeeding decades laid the foundation and largely made possible the second stage of the tuberculosis movement, *i. e.*, that of the establishment of institutions for the treatment of tuberculosis by public philanthropy.

In response then to this preaching of tuberculosis in season and out of season a few scattered and disassociated institutions due to private philanthropic effort made their appearance, too few in number and too limited in scope to be in any sense effective in handling the tuberculous sick of the commonwealth, but promising as an indication of aroused public interest. These institutions were free or partly free, but were maintained in some instances

[1] Read June 3, 1914.

with the assistance of State money both for new buildings and running expenses. The majority of them were established in or about Philadelphia, as will be seen from the appended list of institutions or associations dealing with tuberculosis prior to the year 1907, when the State Department of Health took up this work, inaugurating the third stage of the movement, *i. e.*, that of the official campaign.

The first permanent institution[1] was the Protestant Episcopal City Mission in Philadelphia, which began caring for a few advanced consumptives as early as 1876, but only became an important factor in the crusade in 1886 when it opened the Home for Consumptives at Chestnut Hill. At the earlier date a few rooms were fitted up in the Mission House, the House of Mercy, at 411 Pine Street, for temporary hospital purposes. Where practicable, however, consumptives were cared for in their own homes, the mission securing for them medical attendance, clothing, food from its diet kitchen, and often paying a number of the patient's household to stay home and nurse the patient. It also began sending a few cases to the convalescent retreat at Glen Mills in 1884. This, however, was given up upon the opening of the Home for Consumptives at Chestnut Hill.

The next institution made its appearance fifteen years later, namely, the Rush Hospital for Consumptives in Philadelphia, which opened its dispensary in June, 1891, and its wards in January, 1892, and a Country Branch at Malvern, Pennsylvania, in June, 1892. It moved to its present handsome building at Thirty-second and Lancaster Avenue in January, 1895. The Free Hospital for Poor Consumptives and White Haven Sanatorium Association was organized in Philadelphia in 1895. From 1895 to 1903 it cared for a limited number of advanced consumptives by placing them in the wards of general hospitals at a weekly rate of $5, but gave up this work in 1903, having in 1901 opened the White Haven Sanatorium for early cases at White Haven,

[1] The Church Dispensary of Southwark, a small dispensary caring for tuberculosis sufferers, was opened in 1873, and it may be looked upon as the precursor of the interest of the Protestant Episcopal City Mission in tuberculosis. Its work, however, soon became merged in that of the City Mission.

Pennsylvania. In 1913 it again took up the care of advanced cases of tuberculosis in the Department for Diseases of the Chest, of the Jefferson Hospital, where it contributes to the support of free beds. In 1908 the Department of Tuberculosis of the Philadelphia General Hospital was opened, to care for the city's indigent consumptives. In 1900 the Lucien Moss Home of the Jewish Hospital, Philadelphia, was established, a free service for consumptives of the Jewish faith. 1903 saw the establishment in Philadelphia of an important and far-reaching institution for the study, treatment, and prevention of tuberculosis, the Henry Phipps Institute at Third and Pine Streets. This institution became a department of the University of Pennsylvania in 1910 and formally opened its splendid new hospital at Seventh and Lombard Streets, in May, 1913.

The first institutions outside of Philadelphia were the Small Camp for Consumptives on South Mountain, opened by the State Department of Forestry in 1903, and the West Mountain Sanatorium at Scranton in the same year, followed by the Grandview Sanatorium at Oil City in 1904. Previous to 1906 Pittsburgh had absolutely no provision for its tuberculous sick, but in that year were established the Tuberculosis League of Pittsburgh and the Pittsburgh City Home and Hospital. The Wilkes-Barre Tuberculosis Dispensary was opened in 1906 and was taken over in 1907 by the State Department of Health, and became the first of the chain of State Tuberculosis Dispensaries.

The following antituberculosis associations, whose activities were principally educational in character, were organized previous to 1907 as follows: The Pennsylvania Society for the Prevention of Tuberculosis in Philadelphia in 1892; the Scranton Society for the Prevention and Cure of Tuberculosis in 1903; the Antituberculosis Society of Harrisburg and Vicinity in 1905; the Wyoming Valley Society for the Prevention and Treatment of Tuberculosis in 1906.

The above includes all the free or public institutions caring for cases of indigent consumptives in Pennsylvania prior to 1907. In a number of them a minimum charge was made, though there

were some free beds in all. Throughout the rest of the cities and towns of the State and in the rural districts there was no provision whatever for the free treatment of consumptives. Thus the total provision for the State consisted in 1907 of 687 hospital beds,[1] free or partly free (of which 522 were in Philadelphia); 319 Sanatorium beds,[2] and 7 tuberculosis dispensaries, 5 in Philadelphia, 1 in Pittsburgh, and 1 in Wilkes-Barre. There died from tuberculosis in Pennsylvania in 1907, 10,825 persons.

It is perfectly apparent how inadequate this armamentarium was against a disease so widespread and so largely confined to the poorer classes, pitiably inadequate not only in regard to treatment of the sick themselves, but in relation to the effective work of prevention by segregation and education in the homes of the poor. It may properly be noted also that it had taken twenty years of the hardest kind of individual effort to get this much—not a very promising outlook for the future at that time.

It was thus not a theory but a distressing fact which confronted the State Department of Health created in 1905 under a law drawn up by Dr. Charles B. Penrose, literally tens of thousands of indigent consumptives uncared for and without the facilities existing to care for them, and correspondingly little real effective work along the broader lines of prevention. The situation was so pressing that when the General Assembly met in 1907 the Commissioner of Health had a big practical question to solve, which under the law he was called upon to solve, not to theorize and temporize about, but to show how suitable measures for prevention and treatment of this great army of consumptives could be supplied most economically, most efficiently, and most expeditiously. The brilliant and original answer came at once—a free tuberculosis dispensary was opened in every county of the State, in the more populous centres more than one, and in a short time

[1] In Philadelphia: Home for Consumptives at Chestnut Hill, 70; Rush Hospital, 40; Blockley, 320; Lucien Moss Home, 40; Phipps Institute, 52. In Pittsburgh: Tuberculosis League, 70; City Home and Hospital, 95.

[2] White Haven, 200 of which 100 were free; Rush County Branch, 40; South Mountain Camp, 20; West Mountain Sanatorium (Scranton), 24; Grandview Sanatorium (Oil City), 35.

there were 114 State dispensaries, so distributed that there could not exist in any corner of the State, however remote, an indigent consumptive who could not receive near at hand free medical supervision for himself and family of the highest standard. One large State sanatorium was at once opened and two others planned, one of which has been open for several years and the other is about to be opened. *The efficiency of this system lies in the close relationship between dispensary and sanatorium, so that every indigent consumptive in the State and his family can not only secure treatment at home and in the home, but sanatorium treatment as well; and what is quite as important, is followed up and kept under observation or treatment upon his discharge from the sanatorium.*

Within five years the State had treated over 75,000 patients in its dispensaries, housed over 10,000 patients in its sanatoria, and through its trained nurses paid over 600,000 visits into the homes of its patients. The educational and preventive effect of this system alone is simply amazing.

But there were not wanting critics of this system, and to paraphrase an idea in one of the admirable historical papers of Sidney George Fisher, the eloquence of the minority was raised in opposition. It is one thing to be eloquent in your idealism and advocate a theory when you are not responsible for results, and quite another to act for practical ends when you are in power. I want to discuss Pennsylvania's official system with you not only as to its absolute merits but specifically in relation to conditions existing in Pennsylvania (which I have already outlined) at the time the State took up this work.

The gist of this criticism, which is by no means constructive, is about as follows: it would have been better for the State to have continued to foster by State money both for new buildings and maintenance the few private institutions which were struggling so bravely to carry their unequal burden. It would have been better to encourage the principle of local care, through the establishment by counties or groups of counties, of many small local sanatoria, because it would appear that it was the duty of local communities to care for their own tuberculous sick, and because

consumptives would prefer to go to local institutions, where they could be near home and see their relatives and friends. Parenthetically, so far as Pennsylvania is concerned, I may say that I believe this to be a fallacy on every count; except insofar as it applies to far-advanced consumptives, that is, those so sick as to be unsuitable for strictly sanatorium care. It is manifestly the duty of local communities who can afford to do so to provide local hospital care for this group of cases.

STATE AID FOR PRIVATE INSTITUTIONS

1. The principal of the State granting large subsidies to private institutions for new buildings that they may extend their work, and then being called upon in addition for large subsidies for maintenance that they may keep up this work needs no discussion here. Besides, it must be plain to everybody, (*a*) that under no conditions could private institutions have cared for the tuberculous sick of the Commonwealth, and (*b*) that once the State undertook to do this work itself on a gigantic scale it could not dissipate its resources in this way. It was seen that the tuberculosis problem was not a matter for public philanthropy but of public business, as much a part of the State's business as any other great work for the welfare and advancement of its citizens. Private philanthropy could do much to help, but it could not furnish the means, facilities, workers, or corelationship needed in this field. The State was glad of the existence of such admirable institutions (few in number as they were), and welcomed most heartily their coöperation and assistance, but it could no longer continue largely to build and support them, in those instances where this was the case.

DIFFICULTY OF GETTING LOCAL COMMUNITIES TO ACT

2. Next as to the possibility of getting *local communities* particularly the counties, to act; and let us keep in mind the pressing need there was for definite effective action. It has been pretty conclusively demonstrated that as a rule communities,

whether they be counties or towns, have neither the means nor the awakened interest which will lead them to build and maintain even with State aid local sanatoria. In certain States, in order to encourage this plan, a per capita grant, usually $5 a week for each patient in such institutions, is allowed by the Legislature. The law has usually been mandatory, and yet there has been little response and the situation has drifted on unrelieved. It has been freely acknowledged, by those interested in this plan in some other States, that this kind of legislation accomplishes little; the pressure for local institutions must come from within the community itself. Let us see how this applies to dispensaries. A law in Massachusetts of 1911 made it mandatory on every local community of 10,000 or over to open a local tuberculosis dispensary, but there have been very few so established as a result of this law. The secretary of the Trustees of Massachusetts' Hospitals for Consumptives has publicly stated that this kind of legislation is a failure. How much more effective is Pennsylvania's centralized system, where at the fiat of one man and his Advisory Board 114 dispensaries were opened in every section of the State.

A special committee of the Massachusetts Legislature appointed to investigate the best means and methods to check the spread of tuberculosis has, after a year's deliberation and consultation with the best experts in the country, recently made among others the following recommendations: "1. The need of a central authority to supervise the control of tuberculosis is apparent, and has been pointed out by commission after commission. This Committee recommends a single-headed Department. . . .

"5. So many communities complained to this committee of financial inability to build tuberculosis hospitals that it is recommended that the debt limit be extended for this purpose so that the hospital law on the statute books may be complied with.

"6. The State Board of Health should be give power . . . to provide a State-wide system of visiting nurses."

Certainly the first and last recommendations look as if Massachusetts were anxious to take a leaf from Pennsylvania's system, and the other recommendation endorses my contention of the

financial inability of counties to build hospitals and the futility of attempting by statute to compel them to do so.

New Jersey passed a law in 1910 granting counties or groups of counties the right to establish local sanatoria, and this was made mandatory in 1912; but as a result of that law there have been (I am creditably informed) just two county institutions opened with a combined accommodation of forty beds. How much better, because more economic and effective, is a system that gives us 1000 sanatorium beds in a few years and 2000 within seven years!

It is only fair to say that the State of New York has proceeded largely on the principle of local care and with much success, and it is no doubt due to this fact that this system has been so widely exploited. New York has been able to get the local communities to respond—but money seems to be easier obtained in New York and the people seem to move quicker. At any rate the fact remains that New York City has 4500 beds for tuberculosis (1914) as against 589 in Philadelphia[1]—a far greater number proportionately to its population than Philadelphia. In strictly sanatorium beds the State is not proportionately better off than Pennsylvania, though in addition to the State Sanatorium at Ray Brook, twenty counties in New York State have erected or planned to erect local tuberculosis hospitals.

LARGE INSTITUTIONS MORE ECONOMICAL AND EFFICIENT

3. There is also the question of economy to be considered. It is perfectly apparent that it is more economical to build and administer a sanatorium of 1000 beds than five sanatoria of 200 beds each. This view is generally accepted or at least must be gaining ground, as witness the new Sea View Sanatorium on Staten Island of the New York City Department of Charities just opened with 1000 beds. Otisville, the Sanatorium of the

[1] Blockley, 320; Chestnut Hill, 70; Rush Hospital, 80; Phipps Institute, 24; Jefferson Tuberculosis Department, 40; Lucien Moss Home, 40; Tuberculosis Ward of Episcopal Hospital, 15.

New York City Department of Health, has 600 beds and plans are on foot, I am told, to increase this to 1000.[1]

The plan of the Department of Health of Pennsylvania has been to build a few large institutions rather than many small institutions, because the larger institutions are more economical and can give the patients greater advantages than small sanatoriums can afford. "At Mont Alto Sanatorium, where at present we have 1058 beds, the per capita cost is but $1.15 per day, which figure will likely be reduced. Taking the other charitable institutions in the State handling tuberculosis and figuring out their cost for all classes of patients handled it is more than $1.65 per day. . . . You will readily see an economy on 2000 beds between $1.15 and $1.65 of just fifty cents a day, or the saving to the State of an even $1000 a day. The department's view is that it is wiser to build each sanatorium of sufficient size to reach the maximum economy in management and to save the available funds for other lines of tuberculosis work rather than to fritter away State funds in a large series of small institutions at a much greater cost for maintenance. $1000 a day means $365,000 a year, more than $700,000 for a period of two years. (Royer.)"

Further, the segregation and care of these cases can be as well accomplished from a public health point of view, in the larger as in the smaller institutions; and even a good deal better if the smaller institutions are continually cramped for means, as is apt to be the case with county institutions.

STANDARD OF MANAGEMENT HIGHER IN STATE INSTITUTIONS

4. It is presumable that the standard of excellence would vary, nay, must vary in a number of smaller institutions under separate and different management. It is self-evident that whether under the county commissioners or whatever the personnel of the local boards of management the interest and efficiency of the boards would vary in different localities, either for political or other

[1] Plans are on foot to increase the accommodation at Blockley by 50 beds.

reasons. It does not stretch the imagination unduly as to where to look for and expect the best standard of management, in a local board with individual responsibility merged in a group management, or from one man, a State official, directly and personally responsible to the public, for a public institution in which the whole public is interested and concerned and for which he gets the entire credit or the blame. This point of difference in efficiency of the management of different local hospitals for the care of consumptives has been investigated with results strikingly confirmative of what I say by a committee of the National Association for the Study and Prevention of Tuberculosis. This committee shows that in a relatively large number of the institutions investigated (twenty-five in all), no sputum or urine analyses were made; no reëxaminations of the patients were ever made; no record of the patient's first examination was kept; no record of temperature or nurses' records were kept, and when kept were very incomplete; no record of weight was made except when the patients weighed themselves. In seventeen institutions there were no patients receiving open-air treatment at the time of the inspection. In eleven institutions there were no rules observed in regard to keeping the windows open day and night, and the matter was left more or less to the discretion of the patients, and at the time of the visit the windows of the wards and rooms were tightly closed, etc.

CONSUMPTIVES PREFER TO GO TO DISTANT INSTITUTIONS

5. Do indigent consumptives object to going to a sanatorium at a distance? Let me answer this from an experience of eight years in the largest tuberculosis dispensary in Philadelphia. They do not; they prefer it. Nearly every consumptive has a desire to "go away" for a cure. It is easier to get them to go to a sanatorium at a distance than to one near at hand. This is psychologically a natural view-point, and I have not uncommonly seen patients (in some instances really unsuitable to send away) refuse to go to a nearby institution who were quite willing and anxious to go to Mont Alto or Cresson, where the change of climate and

mountain environment appealed to their hope of a new grasp on health. Further, it is difficult to sever local county institutions from connection with pauper institutions and with poor board officials. This again interferes with the willingness of many to go to such institutions.

PATIENTS BETTER CONTENTED AND STAY LONGER AT DISTANT INSTITUTIONS

6. Patients who go to a sanatorium at considerable distance from their homes seem better contented and do remain longer than those in nearby institutions. We find that at Mont Alto patients stay in direct relation to the distance from which they come. Those who live farthest away stay the longest. This we have shown to be, as a rule, geometrically true; and as an illustration, in a series of one year's cases, 418 in all (investigated by me), who went to Mont Alto from Philadelphia the average length of stay was seven and a half months, while the average length of stay of all cases for the same year was four and a half months. So striking is this that the medical director of Cresson Sanatorium who has investigated it for his institution, and who finds it equally true, has suggested that patients would stay longer and even better results be obtained if Mont Alto took the cases from the western part of the State and Cresson those from the eastern part of the State.

The above I think are convincing practical arguments against the efficiency of small local sanatoria, even granting, for the sake of argument, that this system would ever have really amounted to anything or could have supplied the immediate need of Pennsylvania. It could never possibly have done so, for in Pennsylvania the counties are too poor. Had Pennsylvania attempted to handle the problem in this disassociated and incomplete manner we could not have had in twenty-five nor in fifty years the facilities we have today; and, indeed, we could never have had nor developed the cohesive interrelated and effective system in the close relationship between dispensary and sanatorium that we have today.

THE ADVANCED TOXIC CASE SHOULD BE CARED FOR LOCALLY

7. There is just one phase of the problem where the principle of local care does hold good for self-evident and practical reasons. Everybody admits and desires that local communities should provide accommodation for their far-advanced toxic consumptives, for those cases that are not suitable for strictly sanatorium care. More than 50 per cent. of the cases sent to the State Sanatorium are far-advanced cases, many of them only suitable for infirmary care. The State sanatoria must provide accommodation for these cases, because there is, speaking broadly, no other accommodation for them, but it should not have to take care of this class of cases. Certainly the larger centres of population should have suitable hospitals for these cases, but even they cannot be got to supply these. The pressure for such hospitals must come from within, legislative enactment accomplishes little, and there is ample authority under the law for such communities to build these institutions, and it is devoutly to be hoped that they will see their duty and do so. It is not fair to send dying consumptives to Mont Alto and Cresson, and yet there is no other place to send most of them, and many insist on going. The State stands ready to care for all classes of cases in its sanatoria, because there do not exist adequate facilities for the care of the advanced toxic case at home, where he belongs. I wish to particularly emphasize the distinction I make between local hospitals and local sanatoria. I do not believe that counties or groups of counties should be called upon to build local sanatoria, even in theory; and practically the counties are much too poor in Pennsylvania to ever attempt to do so. Many of them have not even got almshouses and cannot take care of their indigent poor; many of them have no general and no isolation hospital for their contagious diseases and are too poor to provide these. The counties outside the few larger centres of population are very poor, they have practically no money for public improvements or for purposes of philanthropy. They cannot even supply themselves with pure water, it is quixotic to ask them to take care of their tuberculous sick. But I do believe

that the richer and more populous centres, say all cities of 50,000 or over, could and should provide special tuberculosis hospitals (or special wards in general hospitals if the hospitals can be prevailed on to agree to this) for the local care of their toxic advanced consumptives. But even these larger and richer centres will not provide this evident and pressing need; witness Philadelphia and Pittsburgh. It is for this reason that the State must stand ready to take care of all classes of consumptives, and it should do so until local provision of the kind indicated is provided—very much on the same principle and for the same reasons that it should take care of the insane, because local communities cannot afford to bear the great burden of this expense, and yet numerically the insane are insignificant as compared with the tuberculous.

To sum up, I have shown that previous to 1907 facilities in Pennsylvania for getting close to the people both by way of education and treatment of the sick were wholly inadequate, and further lacked interrelationship or cohesiveness. There were a few individuals working manfully for the advancement of the cause, but they were handicapped by lack of means and official power, misconstruction of motives, and too often by working at cross-purposes. The antituberculosis movement had not yet found itself; it was not on a scientific basis. To express it somewhat fancifully it had begun by the preaching of a holy war, which had been followed by a disorganized crusade; and this in turn was finally followed by the strategic investiture and attack of scientific warfare. The enemy is not yet conquered, but is yielding.

CHART I.—Deaths in Pennsylvania from All Forms of Tuberculosis from 1906 to 1913 Inclusive and the Annual Death-rate.

Year.	Population.	Deaths.	Rate per 100,000
1906	7,141,766	10,780	150.9
1907	7,279,972	10,825	148.7
1908	7,417,816	10,211	137.8
1909	7,555,841	10,122	133.9
1910	7,693,866	10,285	133.7
1911	7,831,904	10,604	135.2
1912	7,969,904	9,872	123.7
1913	8,107,942	9,706	121.8

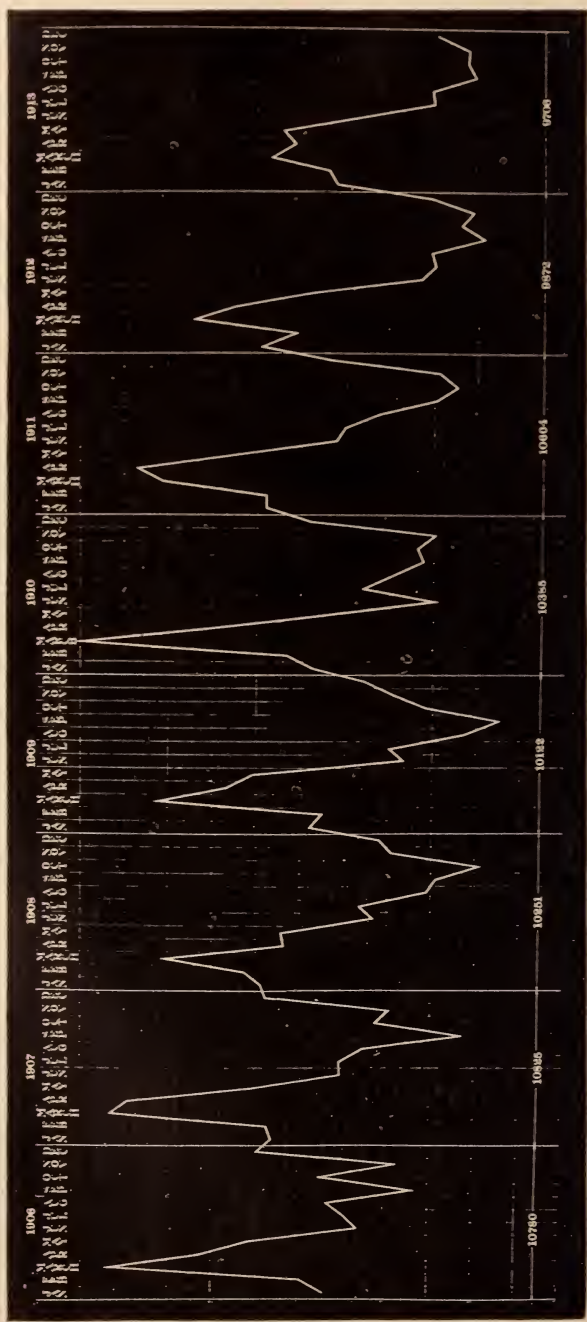

CHART II.—The fatal month of March.

Showing total yearly deaths from tuberculosis in Pennsylvania, *i. e.*, figures at bottom of each yearly column, and the striking periodicity of the mortality curve by months.

CHART III

Median Line of Population
Mod. Alt. 150 m.
Mod. Alt. 45 m.
Mod. Alt. 90 m.
Mod. Alt. 150 m.
Mod. Alt. 90 m.
Mod. Alt. 150 m.
Mod. Alt. 90 m.
Mod. Alt. 150

We have now in Pennsylvania, all inside of seven years, since the State itself took up the work a far-reaching and active campaign of education, State-wide social service, adequate sanatorium beds for strictly sanatorium cases, adequate dispensary service, and the standard of all branches of the service is of the highest; but an essential and important link in this admirable chain forged by the Commissioner of Health, Dr. Samuel G. Dixon, has not yet been added. It is plainly the duty of local communities of 50,000 or over to forge that link for themselves in providing local care for the far-advanced consumptive, who is unsuitable for strictly sanatorium care. Did there but exist in the more populous centres, strategically placed, twelve fairly large hospitals for this group of cases, for there are twelve cities of the class specified, Pennsylvania would be adequately equipped for this branch of the service, so fundamentally important in the prevention of the spread of infection.

Previous to the law of 1905, Pennsylvania as a State had no registration of births and deaths and no mortality statistics. The accompanying charts explain themselves and show the steady and marked reduction in the death-rate from tuberculosis since the State took up this work and the months in which the death-rate is highest, and the position of the State sanatoria and State dispensaries.[1]

DISCUSSION

Dr. James Tyson: I don't think there is any great difference of opinion between Dr. Francine and others of us, who are interested in this subject, upon the statement that the local hospitals are justified only because of the seriousness of the case, which can be accommodated and which he says himself it is not worth while to send to a distance. The outdoor life is much better adapted to the cure of consumption.

[1] I wish to acknowledge my indebtedness for the charts and other statistical data concerning the State work to Dr. Samuel G. Dixon, the Commissioner of Health since the creation of the Department in 1905, and to Dr. B. Franklin Royer, chief medical inspector, for much kind assistance and suggestive and helpful ideas in the preparation of this paper.

At the same time it is not necessary to have sanatoria so far away from home as was formerly thought. There is occasion for them at home as well as in the more distant locations provided by the State.

Dr. Lawrence F. Flick: The subject under discussion is important for every community, and of course important for us. It should be looked at from a broad point of view. I am sorry that I cannot agree in all particulars with the author of the paper. I cannot answer all the points he has raised, but I do wish to say a few words on the principles involved.

First, as to the class of cases. There is no doubt but that what has been done throughout the civilized world for the prevention of tuberculosis proves that the most efficient work is the work for advanced cases. England has almost wiped out its mortality by caring for its advanced cases for nearly one hundred years. It is generally agreed that from cases recovering in sanatoria, we get little reduction in death-rate because these cases, in the majority of instances, relapse and become infectious before they die. For preventive purposes, therefore, it would be more economical to take care of our advanced cases first, until we can take care of all advanced cases, and provide for early cases when means is left over for this purpose.

Philadelphia is a good illustration of what can be done by caring for advanced cases. The best kind of tuberculosis work is done here, because the City takes care of advanced cases. As a result, we have a reduction in our death-rate since 1882 of over 50 per cent.

The essayist has said that the counties cannot afford to take care of their early cases and should provide for their advanced cases. The money, whether used by the State or County, comes from the same people. The people of Philadelphia and Pittsburgh contribute much the larger part of the money used in the tuberculosis campaign, and Philadelphia and Pittsburgh get little return for that money. The proper use of the vast sum of money which is expended in this commonwealth, if expended in the counties and cities, would give better results. If Philadelphia could have the use of the amount which it contributed to the State campaign, it could well take care of its own advanced cases.

A million dollars a year has been expended by the State for the last six years. A careful analysis of the results obtained does not show a justification of the expenditure of that much money. I am convinced that if a more economical method had been followed, such as that by which Philadelphia took care of its advanced cases, the results would be very much better. The campaign in Pennsylvania started with the idea of having local institutions for advanced cases in all the centres

near the homes of the patients, and santoria for early cases. Had this method been continued, good results would have been obtained.

Dr. Guy Hinsdale: I have been somewhat removed from the centre of activity of Pennsylvania for the last ten years, but I would not have the occasion pass without reference to the fine work done by the State of Pennsylvania through the Department of Health for the suppression of tuberculosis throughout the State. Any word which would tend to destroy the confidence which the public has in future work ought never to be uttered. The money appropriated by the State is spent in a judicious way. The 122 dispensaries in the State have accomplished much good. It is only by looking after all cases, incipient as well as advanced, that the best work can be done. The fact that we have all these dispensaries in Pennsylvania and so few beds, comparatively speaking, is something that we must take into account. In New York State they really use, proportionately, more money than in the State of Pennsylvania. There will shortly be established a sanatorium at the seaside on Long Island near Jamaica Bay for the treatment of surgical tuberculosis in children. The plans involve a total outlay of $2,500,000. Work to a large amount is also done at Sea Breeze Hospital, Coney Island, under Bellevue and allied Hospitals.

At Sea Breeze Hospital heliotherapy has been practised for the last two years in a modified form according to Rollier's method.

The institution at Atlantic City under Dr. Bennett is also one of the pioneers in this work. More attention is being given to the treatment of tuberculosis by climatic conditions throughout the world than at any previous time and the results of these methods as practised in the Swiss Alps and on the French coast are very satisfactory.

Dr. Francine (closing): Apropos of Dr. Tyson's remarks, I cannot emphasize too strongly the splendid work, in caring for the far-advanced cases, of local institutions like the Rush Hospital, Chestnut Hill, etc., but unfortunately their beds are always full, and we need in Philadelphia a special municipal hospital of at least 300 beds in addition to the present accommodations for tuberculosis at Blockley. We can keep the 320 beds at Blockley filled with the class of people we can get to go there, and fill an equal number of beds in a special city hospital, not connected with the almshouse, as well. This would go far toward relieving the local situation in Philadelphia.

I will only reply to that part of Dr. Flick's discussion which relates to his statement that the reduction in the mortality for the whole State which my chart shows is due to the reduction in the death-rate in Philadelphia brought about by the Philadelphia Hospital caring for the advanced cases.

The Philadelphia Hospital opened 300 beds for consumptives in 1898. The following mortality figures tell their own tale.

Year.	Population.	Number of deaths.	Rate per 100,000.
1898	1,240,225	2590	208.8
1899	1,266,766	2818	222.4
1900	1,293,697	2824	218.3
1901	1,319,228	2787	211.3
1902	1,344,759	2674	198.8
1903	1,370,290	2970	216.7
1904	1,395,821	3224	231.0
1905	1,421,352	2899	204.0
1906	1,446,883	3266	225.7
1907	1,472,414	3261	221.5
1908	1,497,945	3031	202.3
1909	1,523,476	2889	189.6
1910	1,549,008	3007	194.1
1911	1,574,539	3058	194.2
1912	1,600,070	2654	165.9

It will be seen that for the ten years following the opening of that hospital there was no reduction in the death-rate in Philadelphia whatever, but, on the contrary, an apparent increase, the rate for 1898 being 208.8, and for 1907, 221.5. And, further, it will be seen that beginning with the year 1909 there was the first consistent and progressive fall, bringing the death-rate below 200, until in 1912 it was 165.9. This would seem to me a statistical demonstration of the early effect of the State campaign, certainly the death-rate in Philadelphia did not begin to fall until about a year after the State Dispensaries and Mt. Alto were opened. So that his view and contention are contrary to statistical and demonstrable fact.

In my judgment, therefore, Dr. Hinsdale is right when he states that we should not confine our care to one class of cases to the neglect of the others. It is important to care for the advanced consumptive, but surely if we are to reduce the mortality and prevent new infections we must care for the incipient and moderately advanced case, we must, whenever possible, prevent them becoming the advanced case, and this can only be done by sanatoria. The ambulant case going about and expectorating tubercle bacilli not only infects his own home but disseminates infection more widely than the dying consumptive confined to his home. Therefore it is neither reasonable nor just to speak of sanatoria as accomplishing little in the campaign of prevention—they play a most important and effective role, not only in preventing infection but in reducing the mortality. The same is true of dispensaries. I believe that the sanatorium and dispensary are two most effective agents in prevention, if only on account of their tremendous influence by way of reaching the people

and educating their patients and those the latter come in contact with. I am not arguing against the usefulness of hospitals for advanced cases; this need was clearly emphasized in my paper, but simply insisting that we should not confine our principal efforts to this group alone.

It seems to me that the most important and fundamental feature of our campaign is that of education. If you can educate the mass of the people, that is, of course, the individual, to consult a doctor or a dispensary for suspicious symptoms or at regular intervals where there is a history of contact, and if you can educate the doctors to examine properly and diagnose tuberculosis in its early stages and send at once all such cases to sanatoriums, you will have gone a long way to the solution of the problem of prevention.

FACTORS INVOLVED IN SOME CASES OF PLEURAL FLUID ASSOCIATED WITH NORMAL OR INCREASED VOCAL RESONANCE[1]

By CHARLES M. MONTGOMERY, A.B., M.D.

AND

ENGELHARDT A. ECKHARDT, Ph.D.

Of the many complicated problems in the field of the mechanism of physical signs of the respiratory system, perhaps none has been so admittedly puzzling, particularly in adults, as that of the normal or increased vocal resonance sometimes encountered in cases of pleural effusion. Skoda thought he had solved the riddle by attributing the phenomenon to what he calls consonance, but his explanation is untenable. Walshe's conclusion in regard to our knowledge of the subject is thus expressed: "Sometimes explicable by solid adhesions conveying the vibrations from the lung to the chest wall, in other instances the anomaly does not admit of explanation."

In trying to obtain any explanation,—and only one will be offered here—for the occurrence of normal or increased vocal resonance in cases of pleural effusion, it is necessary first of all to have some knowledge as to the factors operating in cases of effusion in which the vocal resonance is diminished or absent. Assuming that in most cases of pleural effusion the compressed lung still retains more or less air in the alveoli, an occurrence which is certainly very often encountered, and which we find in experimentally produced effusions in which the conduction of

[1] Read June 3, 1914.

sound is impeded more on the side with the effusion than on the normal side, it is not difficult in these cases with some air still remaining in the lung to locate a place where much of the loss of sound might occur, namely, at the junction of the lung with the fluid. Experimentally, it can be readily shown that a marked "break" does occur as sound passes from such an air-bearing lung to fluid. This "break" is apparently largely due to the change of media, the air-borne sounds within the lung having to pass from air, which is a very light medium, to fluid which is a very much more dense medium. There is also often the loss from diffusion as the vibrations traverse the liquid. Recognizing the important part the lung plays in the interference with sound conduction in cases of effusion in which the vocal resonance is diminished or absent, the next logical step in trying to explain those cases exhibiting a normal or increased vocal resonance is to test out other conditions of the lung, to see if any of them might, under the circumstances, contribute more favorable factors to the conduction of sound.

The condition of the lung offering perhaps the most marked contrast to the air-bearing lung is the completely solidified lung. Having no case to report that presented before death a normal or increased vocal resonance, and at autopsy a "solid" lung surrounded by fluid, we are obliged to resort to other means for determining whether a "solid" lung would be favorable to the conduction of sound in cases of pleural effusion.

Our most illuminating experiments along this line have been with the chests of fetal calves near term. In such animals the alveoli being free from air, we are enabled to deal with one type of "solid" lung. Sounds introduced into the trachea of such an animal reach the external chest surface with great distinctness, the conditions apparently being more favorable for sound conduction than in the case of a human being suffering with hepatization of the lung. If fluid is introduced into the pleural cavity of a fetal calf till it is completely filled, the sounds at the periphery of the chest will be found to have undergone comparatively little change, being still very distinct, while if the water in the

pleural cavity is replaced by air the sounds at the external chest surface will be found to have undergone a very marked diminution. If the fetal chest contains fluid and the lung is inflated the sounds at the periphery of the chest will be found to be much weaker than while the lung was still air free.

An experiment comparable to the above with comparable results can be performed with the fetal lung outside the body. If the fetal lung is submerged in a vessel containing water, and sounds are introduced into the trachea, and if a stethoscope is used, the mouth of the bell being tightly covered with a piece of liver to represent chest wall, and if this liver is likewise placed in contact with the water but at no point touching the lung, the sounds will be heard with great distinctness after having passed through fetal lung, water, and liver. Very much weaker sounds will be obtained if the fetal lung is replaced by an air-bearing lung.

Another experiment closely resembling the preceding ones can be made by replacing in the last experiment the fetal lung by a heart. Sounds after entering the aorta and having passed through the cardiac walls, the fluid, and the liver covering the inferior opening of the stethoscope, still retain considerable intensity.

One can readily become convinced of the facility with which sounds pass from "solid" tissue to air by applying a suitable cylinder to the chest wall, and inserting water into this cylinder so that it is in contact with the chest wall, while the opposite end of the cylinder is tightly joined to the bell of the stethoscope. The vocal resonance and the respiratory murmur though diminished will be very distinctly audible.

How closely do our experiments parallel conditions that may occur in the human subject? In each experiment, except the last, as compared to the human being there are three things to be compared, the chest wall (or its representative, liver), the fluid, and the lung. The fetal calf's chest wall corresponds sufficiently closely to the adult chest wall. Even if it is, so to speak, made thicker by overlaying it with liver, much of the sound intensity is retained. As for the fluid, conditions are relatively

much alike in both the experiments and in clinical cases of effusion. Any striking difference, then, in the acoustic phenomena in the experiments and in human beings must relate to the lungs themselves.

The great bulk of the soft cellular tissues, whether normal, inflammatory, or malignant, apart from their fluid contents, is composed of substances known as gels. These gels, of which gelatin in a 10 or 20 per cent. strength in the firm state is an example in pure form, are closely allied in their general physical characteristics, and one would expect this similarity to extend to their acoustic properties. This has been just what has occurred in all our experimental work. We have had sufficient material for experimentation in the shape of fetal lung, liver, and muscle, and though more restricted in obtaining "solid" material from hepatized lungs, experimentation and inference indicate that such diseased tissue in its sound-conducting properties closely resembles the soft tissues of the body, including the fetal lung.

All our evidence indicates that these various substances, liver, muscle, fetal lung, and hepatized lung greatly resemble one another in the following particulars. They are all very poor conductors of sound as compared to air, water, wood, metal, and many other substances. In a general way they considerably resemble one another in their conductivity of sound. When one or more of these materials are placed in apposition the resultant effect on sound conduction is much the same as if a similar amount of any single one of these materials had been used, indicating that no serious "break" occurs as sound passes from one of these substances to another. Finally, in their relation to air and water they all resemble one another closely, that is, there is a marked loss of sound as it passes from air to any of these substances, while there is very much less loss of sound as it passes from these various substances to air, and the passage of sound from these substances to water or in the reverse direction is attended with no serious loss of sound due to the change of media. We conclude, therefore, that these various materials, liver, muscle, fetal lung, and hepatized lung, may be considered for our purposes to be of

one single medium, and to act practically alike in their relation to sound conduction, whether by themselves or in association with other media.

While our chain of evidence is not absolutely complete as far as the lung affected with solid infiltration is concerned, all available evidence indicates that it corresponds acoustically to fetal lung and other gels.

The fluid contents of these various substances does not materially affect their conductivity.

When a pleural effusion exists there may be associated either one of two types of "solid" lung, first, that in which there is no infiltrative process, but from which the air has disappeared as the result of pressure or absorption, leaving a lung closely resembling the fetal type, and, secondly, the lung which is "solid" as the result of inflammatory or malignant change. The airless but otherwise normal lung would, on account of its smaller bulk, probably offer more favorable opportunities for sound conduction than a hepatized lung, provided that in the two cases the bronchi were equally patulous.

It is possible, according to Skoda, for only a portion of a lung to become airless as a result of an effusion and to sink beneath the surface of the fluid.

If our conclusion is correct, that the tissue of a lung "solid," either from compression or actual pulmonary disease, closely resembles fetal lung tissue acoustically, it is clear how the vocal resonance might be normal or increased in cases of pleural effusion. An increase in the vocal resonance in cases of consolidation of the lung is the usual clinical finding, and as long as the bronchi remain patulous the mere presence of fluid between the "solid" lung and the chest wall need not materially affect the transmission of sounds, though the amount of diffusion in the fluid and the distance of the bronchi from the lung surface would exert more or less of an effect. The reasons that no great change should take place are, first, that water is itself a very good conductor of sound, distinctly better than air, and, secondly, that sound vibrations do not suffer materially in intensity as they

pass from "solid" tissue to water or from water to "solid" tissue. This latter fact might be expected to occur, because water and "solid" tissue do not differ greatly in density, but the same thing can be readily demonstrated by a great variety of experiments, such as those of the fetal calf and the others presented above.

Our conception, then, of what we believe occurs in some cases of pleural effusion with a normal or increased vocal resonance may be summarized as follows. The sounds reach the surface of the "solid" lung with a certain degree of intensity, which is naturally greater than would be encountered at the external chest surface in a case of pneumonia without effusion, partly because the sound has not yet passed through the chest wall. The intensity of sound at the lung surface will vary to some extent with the amount of lung tissue that is traversed, so that we would expect there to be louder sounds at the surface of a lung that is airless as a result of compression than one that is "solid" from infiltration. The vibrations then enter the fluid and do this without any serious "break" as a result of the change of media. In their course through the fluid comparatively little sound is lost by absorption because of the excellent conducting properties of fluid, though a variable amount will be lost from diffusion. Finally, the vibrations enter the chest wall, and again effect a transfer of medium without great loss of intensity. In other words, the interference in sound conduction is not greatly different, as a result of the fluid in the pleural cavity, from a case presenting a "solid" lung without any effusion, provided the bronchi remain patulous. It is certainly true that the conditions for sound transmission are much better in a case with a "solid" lung surrounded by fluid than in a case of effusion in which the lung still contains air, or in a case of pneumothorax, whether the lung is either "solid" or air-bearing, provided there is no perforation from the lung into the pleural cavity.

If our explanation is correct why does not this phenomenon occur oftener? As a matter of fact, it is impossible to state just how often a normal or increased vocal resonance does occur in cases of pleural effusion. Small basal accumulations of fluid

overlying "solid" lung giving a normal or increased vocal resonance are probably not very rare. As to the actual causes for the infrequency of the phenomenon, they may be considered to lie chiefly in the lung substance or in the bronchi. We have already spoken of the marked loss of sound that occurs when a lung still retaining air in the parenchyma is in contact with fluid. Interference with sound transmission from bronchial obstruction might be caused either by pressure from without, thus bringing the bronchial walls in apposition, or by the presence of fluid or semi-fluid material within the bronchi, which would occasion an intra-bronchial obstruction to the passage of sounds.

Our conclusions are offered in explanation of only some of the cases of pleural effusion manifesting a normal or increased vocal resonance, for we do not believe the explanation holds good in all cases, and especially in children we believe that other causes may operate.

The conclusions apply to various forms of fluid in the pleural cavity, whether serous, purulent, or hemorrhagic.

The experimental evidence on which the conclusions are based has been reduced to a minimum amount of space, but we trust that it is sufficient to elucidate the subject in hand. The experiments in full will be given elsewhere.

This subject has clinical as well as theoretical interest. Thus in any case of a doubtful nature presenting a normal or increased vocal resonance, the idea of fluid in the pleural cavity should be entertained, and given a case with demonstrable fluid in the pleural cavity exhibiting clinically a normal or increased vocal resonance, the possibility of there being "solid" lung beyond the fluid should be borne in mind. While in some cases such a "solid" lung may be simply a compressed and airless lung, the other alternative is also to be considered, that the lung may be affected with inflammatory or malignant disease. If the condition is a recent one, recently developed consolidation of the lung is to be suspected.

THE CLINICAL INTERPRETATION OF THE WASSERMANN REACTION WITH SPECIAL REFERENCES TO CHOLESTERINIZED ANTIGENS[1]

By JOHN A. KOLMER, M.D., Dr.Ph.
PROFESSOR OF PATHOLOGY IN THE PHILADELPHIA POLYCLINIC AND COLLEGE FOR GRADUATES IN MEDICINE

AND

JAY F. SCHAMBERG, A.B., M.D.
PROFESSOR OF DISEASES OF THE SKIN IN THE PHILADELPHIA POLYCLINIC AND COLLEGE FOR GRADUATES IN MEDICINE

(From the Laboratories of the Philadelphia Polyclinic and College for Graduates in Medicine)

It is now well proved that the antigen in the Wassermann reaction is not necessarily biologically specific, but may be furnished by a variety of different lipoids from normal or syphilitic tissues. While it is true that extracts of a normal liver are generally inferior to extracts of syphilitic liver as antigen, in this reaction it is equally true that alcoholic extracts of normal human heart may be equal or superior to alcoholic extracts of syphilitic liver, indicating that alcohol serves to extract from heart muscle a lipoid similar in its antigenic properties at least to that found in liver due to the presence and activities of Treponema pallidum.

The serum of a syphilitic is characterized by the presence of an antibody-like substance, which has a great affinity for lipoids (lipodotropic), and in a mixture with them will cause the absorption or fixation of complement to a well marked degree. The old conception of the reaction which regarded the antigen as

[1] Read October 7, 1914.

specific is erroneous; rather the nature of the antibody constitutes the specific character of the reaction because of its ability to absorb or fix complement in the presence of a lipoid. This antibody or "reagin" will, however, react better with some lipoids than with others and hence the necessity of finding that lipoid or combination of lipoidal substances which possesses most affinity or antigenic sensitiveness for the lipoidophilic antibody, regardless of whether these lipoids are derived from syphilitic or normal tissues. In other words, the main principle and all that is definitely known of the syphilitic reaction is that while lipoidal extracts, as well as normal and luetic serums, may separately absorb or fix small amounts of complement, a mixture of a suitable extract and syphilitic serum is capable of fixing larger amounts of complement. Therefore, while the antigen is not biologically specific nor the antibody endowed with the property of reacting with but one lipoidal substance, the Wassermann reaction is, nevertheless, highly specific because a similar lipoidophilic antibody is found practically in two other diseases, namely, frambesia and leprosy. When these may be excluded the Wassermann reaction becomes highly specific and one of the best diagnostic aids known in modern medicine. Most efforts of late, therefore, have been made to increase the delicacy of the Wassermann reaction and yet keep it specific by attention to technical points in the hemolytic system and by attention to the tissue extract used as antigen.

Since Sachs[1] originally proposed alcoholic extracts of beef heart reinforced with cholesterin as antigens in the Wassermann syphilis reaction, most observers who have employed these antigens have reported them as being quite sensitive and superior to all others. Thus McIntosh and Fildes[2] found cholesterinized heart extracts much superior to a plain extract of normal heart, to alcoholic extracts of syphilitic liver and to the lecithin-cholesterin mixture of Browning, and on account of their sensitiveness and the constancy of their qualities believe that they fulfil the

[1] Berl. klin. Wochnschr., 1911, xlviii, 2066.
[2] Ztschr. f. Chemotherap., Orig., 1912, pp. 1, 79.

requirements of a standard antigen. Walker and Swift[1] have reported equally favorably upon cholesterin heart extracts, having found them superior to alcoholic extracts of syphilitic liver, simple in preparation and of constant antigenic value. One of us (Kolmer) with Laubaugh, Casselman, and Williams[2] has been interested in this subject for several years and has made a study of cholesterinized extracts as compared with a number of other well-known antigens, particularly alcoholic extracts of syphilitic liver and acetone-insoluble lipoids. Our studies proved quite conclusively that a cholesterinized alcoholic extract of normal heart constitutes the most delicate antigen of the large number of extracts studied, acetone-insoluble lipoids coming second and proving the best non-cholesterinized extract. As compared with alcoholic extracts of syphilitic liver the cholesterinized extracts gave 29.4 per cent. stronger reactions, and what is more important yielded positive reactions in 23 per cent. of cases where the reaction with an alcoholic extract of syphilitic liver was negative. In an analysis of these cases it was found that the positive result was generally correct and but an expression of the higher antigenic sensitiveness of the cholesterinized antigens. This was true in cases yielding 50 per cent. or more inhibition of hemolysis. In a number of cases, however, the cholesterinized extracts yielded 25 per cent. or less inhibition of hemolysis with complete negative reactions with alcoholic extracts of syphilitic liver, and such cases have given us much concern as to the proper interpretation to be made of the results. Using the serum of normal persons we found 5 to 10 per cent. of these cholesterinized extracts would yield pseudo-reactions of about 10 per cent. or less inhibition of hemolysis. In other words strong positive reactions with cholesterinized extracts indicate the presence of syphilis even though the reaction from alcoholic extracts of syphilitic liver were clearly negative; but weak positive reactions are more difficult to interpret and the chief object of the present communication deals with this class of reactions based upon a group of cases

[1] Jour. Exper. Med., 1913, xviii, 75.
[2] Archiv Int. Med., 1913, xii, 660.

tested with different extracts and carefully studied from the clinical aspect.

Additional reports upon cholesterinized extracts as antigens in the Wassermann reaction have been made by Field,[1] Thompson,[2] and Judd,[3] all of whom compared them with other antigens as alcoholic extracts of syphilitic liver and acetone-insoluble lipoids, and reported favorably upon the superior qualities of the cholesterinized heart extracts. Thomas and Ivy[4] secured a relatively large number of what they considered pseudo or false positive reactions and are opposed to their use.

The main purposes of this communication are fourfold:

1. To further study the antigenic value of cholesterinized alcoholic extracts of normal heart as compared with alcoholic extracts of syphilitic liver and acetone-insoluble lipoids.

2. To study with particular care those cases reacting only with cholesterinized extracts and negatively with other antigens in order to determine the specificity of the reaction with cholesterinized antigens.

3. To study the question of weak positive reactions with cholesterinized extracts and the serums of persons who deny syphilitic infection and who present no evidences of the disease.

4. To study the value of the Wassermann reaction performed with cholesterinized extracts as a control on the treatment of syphilis.

Technique and Method of Study. There is general agreement among those who have employed cholesterinized antigens regarding the remarkable sensitivity and antigenic value of these extracts. Not all observers, however, have mentioned the possibility of obtaining slight degrees of inhibition of hemolysis with an occasional serum from a person who denies syphilitic infection and who presents no clinical evidences of the disease, although it is practically impossible to rule out latent hereditary syphilis with absolute certainty in all instances.

The antihemolytic activity of cholesterin is well known and

[1] Jour. Amer. Med. Assn., 1914, lxii, 1620.
[2] Ibid., 1458.
[3] Ibid., lxiii, 313.
[4] Ibid., lxii, 363.

unless the extracts reënforced with this substance are carefully standardized the tendency to obtain varying degrees of inhibition of hemolysis with normal serum becomes more and more in evidence. In using these extracts, therefore, the first requirement is a careful titration of their antigenic and anticomplementary values; in the Wassermann reaction we use two or three times the antigenic unit as one dose, providing that this amount is at least eight or ten times less than the anticomplementary unit.

If exactly one unit of complement and one unit of hemolytic amboceptor are employed in a technique, the percentage of pseudo-reactions with cholesterinized antigens is likely to be relatively high because of the natural antihemolytic activity of cholesterin in addition to the anticomplementary action of the alcoholic extract and patient's serum themselves. This influence may be overcome in a large percentage of cases by using at least one and a half or two units of complement of hemolytic amboceptor in conducting the reaction. It is important to remember this antihemolytic tendency of cholesterin and provide for it in our hemolytic system if antigens reënforced with cholesterin are being employed. As expected old serums, those containing appreciable amounts of thermostabile anticomplementary bodies, are more likely to show their anticomplementary condition with cholesterinized than with plain extracts.

With antigens which are carefully standardized at frequent intervals we have for several years used one and a half or two units of complement or hemolytic amboceptor in conducting the Wassermann reaction. Our usual custom is to use 0.05 c.c. (1 c.c. of 1 to 20 dilution) of fresh guinea-pig serum as a unit of complement and after titrating the hemolytic amboceptor with the complement and corpuscles used in the day's work to employ one and a half or two units of the amboceptor in the antigen titration and in the Wassermann reactions. The results of the reactions herein recorded were conducted in this manner. Even under these conditions we have found a small percentage of cases denying syphilis and showing us clinical evidences of the disease to yield slight (10 per cent. or less) inhibition of hemolysis with the

cholesterinized extracts; possibly a portion of these might have been avoided by using larger amounts of complement or amboceptor; at least the importance of not using more of the antigen than is necessary and of using more than one unit of complement or amboceptor are to be emphasized.

The use of multiple units of complement or amboceptor up to two or three units does not appear to impair the delicacy of the reaction of cholesterinized extracts with syphilitic serum and lessens the effect of the antihemolytic action of the cholesterin and the tendency for false positive reactions with normal serums. It is peculiar of these reënforced extracts that when they inhibit or fix complement with syphilis antibody the degree of fixation is usually quite marked and not so readily masked by an excess of complement or hemolytic amboceptor as when plain antigens are employed.

For several years it has been our custom to use at least three different antigens with each serum in conducting the Wassermann reaction. The two main reasons for this practice are, first, to better study cholesterinized extracts as compared with plain extracts with a check upon the possibility of pseudo-reactions; and secondly, because we have reason to believe that the lipodophilic reagin or syphilis antibody in different serums concerned in the Wassermann reaction, has a different affinity for lipoidal extracts, and that these differences are independent of any changes in the antigens themselves. With the serum of active syphilis most any extract will serve to fix complement and yield a positive reaction, but when the amount of antibody is small, as in long standing or vigorously treated cases, the questions of antigen and technique become of considerable importance. It is in such cases that we have noted the varying degrees of reaction with different antigens of equal efficiency, and it was not uncommon to find a negative reaction with one antigen and a positive with the others. In not a few cases dependence on a single extract would have led to false negative reactions with serums of cases where treatment was being guided by the serum reactions. This is especially true of alcoholic extracts of syphilitic liver; less

true of acetone-insoluble lipoids and least likely to occur with cholesterinized extracts.

It is the practice of one of us (Kolmer) to employ a cholesterinized alcoholic extract of human or beef heart, an alcoholic extract of syphilitic liver and an extract of acetone-insoluble lipoids in conducting the Wassermann reaction with each serum. As recorded by one of us in the paper previously mentioned, acetone-insoluble lipoids was found the best non-cholesterinized or plain antigen. The results of several hundred reactions performed since then substantiate this observation. In other words, we have found cholesterinized alcoholic extracts of normal heart most sensitive; an extract of acetone-insoluble lipoids second in the order of antigenic sensitiveness and alcoholic extracts of syphilitic liver somewhat less sensitive than the other two.

Materials Used in This Study. *Antigen.* Two kinds of cholesterinized extracts were used, namely, alcoholic extracts of human and beef heart reënforced by the addition of 0.4 per cent. pure cholesterin. Human heart extract has been found superior to that of beef heart and guinea-pig heart. An alcoholic extract of syphilitic liver and suitable extracts of the acetone-insoluble lipoids from human and beef heart were used in a comparative study with the cholesterinized extracts.

Serums. In all, the serums from 434 persons have been tested during the past seven months. These were mostly secured from cases in private practice and from the wards and out-patient clinics of the Polyclinic Hospital. In Table I are listed 239 cases in which a history and clinical diagnosis were available; in Table II are listed 175 cases in which the diagnosis was incomplete or not given. We have excluded from this table all cases which reacted with cholesterinized extracts only, because without a history they are not available for critical study.

TABLE I

No.	Name.	Diagnosis.	Wassermann reaction		
			Cholesterinized alcoholic extract of human or beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
1	W. S.	Chr. interstit. neph.	−	−	−
2	W. S.	Tabes dorsalis	++++	++++	++++
3	J. F.	Iritis	−	−	−
4	D. F.	Adenopathy	++++	+++	++++
5	R. F.	Gastro-enteritis	−	−	−
6	R. F.	Malaria	−	−	−
7	C. F.	Tertiary fever	++++	++	++++
8	N. F.	Typhoid fever	−	−	−
9	J. F.	Suspected chancre	+++	+++	+++
10	W. E.	Primary optic atrophy	+++	−	−
11	J. E.	Lobar pneumonia	−	−	−
12	H. E.	Apoplexy	−	−	−
13	W. E.	Tertiary syphilis	++++	++++	++++
14	C. D.	Bronchopneumonia	−	−	−
15	G. G.	Chr. myocarditis	−	−	−
16	M. D.	Hemiplegia	−	−	−
17	A. D.	Coccygodynia	−	−	−
18	J. D.	Lupus erythematosis	−	−	−
19	B. D.	Tabes dorsalis	++++	++++	++++
20	D. A.	Chonoretinitis	++++	++++	++++
21	N. A.	Esophageal stricture	++++	++++	++++
22	F. A.	Neurasthenia	−	−	−
23	R. A.	Tertiary syphilis	++++	++	+++
24	C. A.	Cerebral palsy	+	−	±
25	E. B.	Hereditary syphilis	+++	−	−
26	H. B.	Lobar pneumonia	−	−	−
27	H. G.	Sore on penis	−	−	−
28	M. B.	Persistent thymus	++	−	±
29	B. B.	Latent syphilis	++++	−	+
30	W. B	Foundling	−	−	−
31	E. B.	Carcinoma of tongue	−	−	−
32	H. B.	Chancre	++++	++	++
33	J. B.	Visceroptosis	−	−	−
34	W. B.	Chronic myocarditis	−	−	−
35	S. B.	Tumor of breast	+	−	−
36	J. B.	Hemiplegia	+	±	±
37	A. B.	Epilepsy	−	−	−
38	M. B.	Tabes dorsalis	+++	+	+
39	W. B.	Apoplexy	−	−	−
40	A. B.	Infantile atrophy	−	−	−
41	F. B.	Infantile atrophy	−	−	−
42	H. C.	Foundling	−	−	−
43	B. C.	Urticaria	−	−	−
44	G. C.	Malnutrition	−	−	−
45	A. C.	Secondary syphilis	++++	++++	++++
46	R. C.	Tertiary lues	++++	++	++
47	M. C.	Leg ulcer	−	−	−
48	E. C.	Intestinal indigestion	−	−	−
49	J. C.	Tertiary syphilis	++++	++++	++++
50	O. B.	Labyrinth. disease	+	±	±

No.	Name.	Diagnosis.	Wassermann reaction		
			Cholesterinized alcoholic extract of human or beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
51	E. C.	Pneumonia. Syphilis	+++	++	+++
52	A. L.	Tabes dorsalis (?)	–	–	–
53	B. C.	Tabes dorsalis	++++	++++	++++
54	W. C.	Secondary syphilis	++++	++++	++++
55	M. C.	Cirrhosis or cancer of liver	++	–	–
56	B. C.	Icterus of newborn	–	–	–
57	B. L.	Chronic arthritis	–	–	–
58	W. S.	Chronic myocarditis	–	–	–
59	C. Z.	Acute rheumatism	–	–	–
60	A. Y.	Tertiary syphilis	++++	++++	++++
61	W. Y.	Carcinoma of stomach	–	–	–
62	C. W.	Syphilis (secondary)	++++	++++	++++
63	B. W.	Enteritis	–	–	–
64	P. W.	Tertiary syphilis	++++	+	++++
65	J. W.	Cirrhosis of liver (?)	–	–	–
66	J. E.	Syphilis	+++	+	++
67	G. W.	Chronic nephritis	++	+	–
68	F. W.	Malnutrition	–	–	–
69	D. M.	Psoriasis	–	–	–
70	F. W.	Myalgia	–	–	–
71	S. W.	Malnutrition	–	–	–
72	W. W.	Rachitis	–	–	–
73	M. W.	Hemorrhagic retinitis	++	+	±
74	G. J.	Mycosis fungoides	–	–	–
75	D. J.	Chorea	–	–	–
76		Normal baby	–	–	–
77	M. T.	Malnutrition	++++	–	–
78	G. J.	Cholecystitis	–	–	–
79	M. J.	Malnutrition	–	–	–
80	N. J.	Salpingo-oöphoritis	–	–	–
81	N. S.	Epilepsy	–	–	–
82	B. T.	Ulcer of tongue	+	+	+
83	W. B.	Chancroids (?)	++	+	++
84	J. S.	Renal tuberculosis	–	–	–
85	H. S.	Infantile hemiplegia	+	–	–
86	J. S.	Tertiary syphilis	++++	++++	++++
87	M. S.	Hepatic colic	+++	+	+++
88	W. S.	Verruca plana	–	–	–
89	L. S.	Acute rheumatism	–	–	–
90	J. C.	Furunculosis	–	–	–
91	M. S.	Tertiary syphilis	++++	++++	++++
92	W. S.	Dysphagia syphilitic	++++	+	++++
93	R. S.	Malnutrition	–	–	–
94	J. S.	Hereditary syphilis	+++	+	+
95	F. S.	Aortic regurgitation	++++	+	+++
96	M. F.	Malnutrition	–	–	–
97	C. S.	Chronic osteolitis	+++	++	+++
98	J. D.	Locomotor ataxia	++++	++	++++
99	J. S.	Tabes dorsalis	++++	–	++
100	S. G.	Malnutrition	–	–	–

No.	Name.	Diagnosis.	Wassermann reaction		
			Cholesterinized alcoholic extract of human or beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
101	S. S.	Chronic myocarditis	–	–	–
102	E. S.	Tabes dorsalis	++++	++	+++
103	M. S.	Arteriosclerosis	–	–	–
104	R. S.	Pneumonia	–	–	–
105	Y. R.	Sarcoma	–	–	–
106	H. R.	Ac. cardiac dilatation chorea	+	–	–
107	M. R.	Primary optic atrophy	++++	++++	++++
108	S. R.	Chronic endocarditis	–	–	–
109	R. R.	Secondary syphilis	++++	+	+
110	M. R.	Secondary anemia	++	++	++
111	L. R.	Pulmonary tuberculosis	–	–	–
112	E. R.	Lobar pneumonia	–	–	–
113	A. R.	Major hysteria	++++	+	+
114	F. C.	Cardiorenal disease	++++	–	++
115	W. P.	Pneumonia	–	–	–
116	G. C.	Acute bronchitis	–	–	–
117	W. P.	Secondary syphilis	++++	++++	++++
118	E. P.	Pneumonia	–	–	–
119	S. A.	Apoplexy	–	–	–
120	S. N.	Detachment of retina	++++	++++	++++
121	A. N.	Acute rheumatism	–	–	–
122	H. M.	Hemiplegia	++	–	++
123	M. M.	Fistula in ano	++++	++++	++++
124	G. M.	Diabetic coma	–	–	–
125	S. M.	Tertiary syphilis	++++	++++	++++
126	P. N.	Acute rheumatism	–	–	–
127	T. M.	Tabes dorsalis	+	–	–
128	P. M.	Thrombosis	–	–	–
129	F. M.	Chronic gastritis. Tabes (?)	++++	+	++++
130	A. M.	Adenopathy	++++	++++	++++
131	W. M.	Acute rheumatism	–	–	–
132	W. M	Optic atrophy	–	–	–
133	— M.	Rectovaginal fistula	–	–	–
134	A. M.	Acute dementia	++	–	–
135	E. M.	Persistent headache	–	–	–
136	K. McH.	Acute rhinitis	–	–	–
137	P. McG.	Carcinoma or syphilis of hip	+++	–	+
138	F. G.	Pneumonia	–	–	–
139	— McF.	Thrombosis	–	–	–
140	C. G.	Tertiary syphilis	++++	++++	++++
141	— S.	Husband under treatment for syphilis	–	–	–
142	W. C.	Acute enteritis	–	–	–
143	A. C.	Diabetes mellitus	++++	++	++++
144	H. L.	Chronic nephritis	–	–	–
145	T. L.	Chronic endocarditis	–	–	–
146	L. L.	Cardiac decompensation	–	–	–
147	F. L.	Diabetes mellitus	–	–	–
148	A. L.	Rectal fistula	–	–	–
149	J. L.	Iridokeratitis	–	–	–

No.	Name.	Diagnosis.	Wassermann reaction		
			Cholesterinized alcoholic extract of human or beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
150	J. G.	Typhoid fever	−	−	−
151	J. L.	Secondary syphilis	++++	++++	++++
152	H. J.	Osteoperiostitis	−	−	−
153	J. J.	Epilepsy	++++	++++	++++
154	L. J.	Specific laryngitis	++++	++++	++++
155	C. Y.	Secondary syphilis	++++	++	+++
156	M. L.	Hereditary syphilis	++	−	+
157	C. K.	Keratitis (interstitial)	+++	±	++
158	A. K.	Diabetes mellitus	−	−	−
159	D. K.	Chorea	−	−	−
160	J. K.	Sciatica	−	−	−
161	G. K.	Duodenal ulcer	++	++	++
162	J. K.	Gastric ulcer	−	−	−
163	— K.	Maternal syphilis	+	D. H.	+
164	Y. K.	Visceroptosis	−	−	−
165	A. G.	Tertiary syphilis	++++	++++	++++
166	W. G.	Hemiplegia	++++	±	++
167	L. K.	Paraplegia	−	−	−
168	S. G.	Osteoperiostitis	+	−	−
169	E. G.	Gastric ulcer	−	−	−
170	A. G.	Gumma of spine	++++	++	++++
171	H. G.	Renal colic. Tabes (?)	++++	++++	++++
172	N. G.	Optic atrophy	++++	++++	++++
173	J. G.	Tertiary syphilis	++	+	±
174	R. G.	Suspicious mucous patches	++++	−	−
175	R. G.	A scar of the nose	−	−	−
176	R. G.	Hereditary syphilis	−	−	−
177	J. G.	Neuralgia	−	−	−
178	S. G.	Cardiorenal disease	−	−	−
179	P. G.	Bronchopneumonia	−	−	−
180	F. C.	Tuberculous adenitis	−	−	−
181	A. G.	Bronchitis	−	−	−
182	R. H.	Tertiary syphilis	++++	+	++++
183	E. H.	Dactylitis	++++	++++	++++
184	E. F.	Hemiplegia	−	−	−
185	W. H.	Osteitis	++++	++++	++++
186	L. H.	Secondary syphilis	++++	+	++
187	W. S.	Osteoma (?)	++++	+	++
188	R. H.	Fracture of skull	−	−	−
189	— H.	Acute suppurative adenitis	−	−	−
190	A. H.	Pneumonia	−	−	−
191	M. H.	Acute vulvitis	−	−	−
192	R. H.	Tertiary syphilis	++++	++++	++++
193	R. S.	Ulcer on leg	+++	−	±
194	J. H.	Sciatica	−	−	−
195	S. P.	Verruca	−	−	−
196	H. H.	Syphilis (?) chancroids	−	−	−
197	——	Adenopathy	++++	++++	++++
198	J. S.	Stricture of rectum	++++	++++	++++
199	A. M.	Adenopathy	++++	++++	++++

No.	Name.	Diagnosis.	Wassermann reaction		
			Cholesterinized alcoholic extract of human or beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
200	E. B.	Hereditary syphilis	+	−	−
201	B. D.	Arteriosclerosis	++++	−	−
202	G. R.	Syphilitic laryngitis	++++	++++	++++
203	J. H.	Maternal syphilis	+++	+	+++
204	L. H.	Tuberculosis of skin	−	−	−
205	M. T.	Malnutrition, hereditary lues (?)	++++	−	−
206	R. H.	Maternal syphilis	++++	+	++++
207	W. S.	Carcinoma of stomach	±	−	−
208	C. B.	Tertiary syphilis	++++	++++	++++
209	N. B.	Neurasthenia	−	−	−
210	S. C.	Abscess	−	−	−
211	M. C.	Neurasthenia	−	−	−
212	B. C.	Secondary syphilis	++++	++++	++++
213	E. J.	Gastric ulcer	−	−	−
214	T. K.	Acute neuritis	+	−	−
215	B. F.	Tertiary syphilis	++++	++	++++
216	A. M.	Acute conjunctivitis	−	−	−
217	J. M.	Acute vaginitis	−	−	−
218	R. McK.	Gastric ulcer	−	−	−
219	G. W.	Secondary syphilis	++++	+++	++++
220	W. G.	Traumatic hemiplegia	−	−	−
221	M. G.	Gastric carcinoma	−	−	−
222	M. G.	Acute gastritis	−	−	—
223	T. B.	Myalgia	−	−	—
224	C. Y.	Chronic aortitis	++++	+	++++
225	J. R.	Acute enteritis	−	−	−
226	W. H.	Tertiary lues	++++	+	++++
227	— C.	Normal person	−	−	−
228	M. B.	Eczema	−	−	−
229	W. H.	Tuberculous glands	−	−	−
230	G. W.	Syphilis	++++	+++	++++
231	B. C.	Syphilis	++++	++	++++
232	A. A.	Squamous eczema	−	−	−
233	C. N.	Hereditary syphilis	±	+	+
234	J. A.	Hereditary syphilis	±	−	−
235	F. McL.	Syphilis	+	−	−
236	Mrs. K.	Syphilis	+	D. H.	−
237	O. R.	Tertiary syphilis	+	−	−
238	P. McG.	Syphilis suspected	+++	−	−
239	D. M.	Sycosis vulgaris	+	D. H.	D. H.

++++ = complete inhibition of hemolysis.
+++ = 75 per cent. inhibition of hemolysis.
++ = 50 per cent. inhibition of hemolysis.
+ = 25 per cent. inhibition of hemolysis.
± = about 10 per cent. inhibition of hemolysis.
D. H. = delayed hemolysis.
− = complete hemolysis.

TABLE II

No.	Name.	Wassermann Reaction		
		Cholesterinized alcoholic extract of human or beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
240	M. C.	−	−	−
241	A. M.	−	−	−
242	B. F.	++++	++++	++++
243	E. J.	−	−	−
244	R. K.	−	−	−
245	J. M.	−	−	−
246	M. G.	−	−	−
247	W. G.	−	−	−
248	M. G.	−	−	−
249	T. B.	−	−	−
250	F. B.	−	−	−
251	M. B.	−	−	−
252	L. D.	−	−	−
253	A. J.	−	−	−
254	W. E.	−	−	−
255	M. K.	−	−	−
256	I. K.	−	−	−
257	L. L.	++	±	+
258	S. L.	−	−	−
259	E. McN.	−	−	−
260	E. M.	−	−	−
261	F. M.	+	+	±
262	R. M.	−	−	−
263	C. M.	−	−	−
264	H. M.	−	−	−
265	D. N.	++++	++++	++++
266	S. S.	−	−	−
267	J. S.	+	±	±
268	R. S.	−	−	−
269	R. S.	−	−	−
270	J. S.	++++	++++	++++
271	P. S.	−	−	−
272	G. S.	++++	++++	++++
273	H. S.	−	−	−
274	S. S.	−	−	−
275	O. T.	−	−	−
276	F. T.	−	−	−
277	Z. R.	−	−	−
278	E. R.	++++	++++	++++
279	E. H.	−	−	−
280	T. Y.	−	−	−
281	M. W.	−	−	−
282	F. P.	−	−	−
283	A. R.	++++	++	++++
284	G. R.	++++	++++	++++
285	C. W.	++++	++++	++++
286	M. M.	+++	+	++
287	M. J.	++	+	+
288	M. R.	++++	+++	++++
289	M. L.	++++	++++	++++
290	R. R.	++++	++++	++++
291	R. H.	−	−	−

Table II (Continued)

No.	Name.	Wassermann Reaction		
		Cholesterinized alcoholic extract of human or beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
292	P. L.	−	−	−
293	G. H.	−	−	−
294	A. K.	++	−	−
295	M. L.	+	±	+
296	F. H.	−	−	−
297	J. S.	++	−	+
298	C. M.	++++	++	++++
299	J. S.	++	−	++
300	C. K.	−	−	−
301	A. A.	±	±	±
302	M. R.	−	−	−
303	M. K.	++++	++	++++
304	M. McC.	++++	++++	++++
305	D. A.	++++	++++	++++
306	D. McC.	−	−	−
307	N. M. G.	+++	+	++
308	M. L.	+++	+	+
309	M. V.	++	−	+
310	F. C.	−	−	−
311	D. C.	−	−	−
312	D. S.	−	−	−
313	A. W.	−	−	−
314	A. St. T.	++++	++++	++++
315	S. B.	−	−	−
316	C. B.	−	−	−
317	M. S.	−	−	−
318	P. L.	++++	++	++++
319	D. L.	++++	++	+++
320	L. C.	++	++	++
321	S. K.	++++	+++	+++
322	S. C.	++++	++++	++++
323	C. G.	+	±	±
324	R. L.	++++	+++	++++
325	S. T.	−	−	−
326	F. P.	−	−	−
327	D. F.	++++	+++	++++
328	F. F.	−	−	−
329	M. S.	++	+	++
330	A. F.	−	−	−
331	M. G.	−	−	−
332	K. G.	++++	+++	++++
333	L. S.	+	±	±
334	G. M.	++++	++	+++
335	A. S.	±	±	±
336	M. R.	++++	++++	++++
337	R. N.	++	++	++
338	E. A.	++++	+++	++++
339	A. C. W.	++	++	++
340	E. C.	+	+	+
341	I. C.	++++	++	++++
342	K. S.	+++	+	++
343	J. L. L.	++++	±	+
344	P. L.	++	+	++
345	S. N.	++	+	+

No.	Name.	Wassermann Reaction		
		Cholesterinized alcoholic extract of human or beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
346	L. W.	−	−	−
347	M. G.	−	−	−
348	W. W.	+	+	+
349	G. S.	−	−	−
350	S. H.	++	++	++
351	E. M.	−	−	−
352	L. B. S.	++++	+++	+++
353	R. F.	++++	++	++++
354	B. C.	++++	++++	++++
355	C. A.	++++	++	++
356	S. W.	++++	++++	++++
357	A. T.	−	−	−
358	F. F.	−	−	−
359	L. P.	+++	+++	+++
360	F. W.	++++	++++	++++
361	J. W.	+++	+	+++
362	K. T.	++++	++++	++++
363	D. B.	−	−	−
364	S. T.	++++	++++	++++
365	S. C.	+++	+++	+++
366	D. C.	−	−	−
367	H. S.	++	+	+
368	R. S.	−	−	−
369	L. J.	++++	++++	++++
370	K. B.	+++	+++	+++
371	P. A.	+	+	+
372	T. C.	++++	++++	++++
373	H. W.	+++	+++	+++
374	M. N.	−	−	−
375	F. S.	−	−	−
376	C. A.	−	−	−
377	B. G.	+	+	+
378	D. B.	−	−	−
379	S. S.	−	−	−
380	M. S.	−	−	−
381	R. B.	−	−	−
382	F. N.	−	−	−
383	W. N.	−	−	−
384	C. O.	−	−	−
385	D. S.	++++	+	+++
386	F. S.	++++	+++	+++
387	A. L.	−	−	−
388	A. S.	−	−	−
389	A. W.	+	+	+
390	F. T.	−	−	−
391	B. N.	−	−	−
392	M. L.	−	−	−
393	P. P.	++	++	++
394	R. H.	−	−	−
395	H. S.	++++	++++	++++
396	R. N.	++++	++++	++++
397	F. C.	−	−	−
398	H. S.	−	−	−
399	M. S.	−	−	−

No.	Name.	Wassermann Reaction		
		Cholesterinized alcoholic extract of human or beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
400	L. W.	++++	+++	+++
401	P. W.	–	–	–
402	C. W.	–	–	–
403	L. B.	–	–	–
404	M. M.	–	–	–
405	S. S.	+++	+++	+++
406	A. R.	++	++	++
407	D. W.	++++	++++	++++
408	B. S.	++++	++	++
409	J. P.	++	+	+
410	J. H.	++++	++	+++
411	R. H.	++++	++	++++
412	C. B.	++++	++++	++++
413	N. B.	–	–	–
414	S. C.	–	–	–
415	B. C.	++++	++++	++++

1. A general examination of these tables shows that with 214 of the 414 serums the reactions were negative with all antigens including the cholesterinized extracts. In a further study of the question of false positive reactions with cholesterinized extracts we shall have occasion to refer to them in more detail.

2. With 200 serums a positive reaction was observed with one or more of the antigens. With 164 serums the reactions were positive with all three antigens but the degree of the reaction was not equal with all. Thus with 82 serums or exactly 50 per cent. the results were equal and in the remaining 50 per cent. the reactions with the different extracts varied to some degree. These are worthy of further analysis in order to study the relative sensitiveness of the different extracts.

3. Even a cursory examination of the tables will suffice to show the greater antigenic sensitiveness of cholesterinized extracts; that they serve to give positive reactions with luetic serums reacting weakly or negatively with alcoholic extract of syphilitic liver with acetone-insoluble lipoids and that the tendency to produce pseudoreactions with normal serums is almost nil.

Antigenic Value of Cholesterinized Extracts as Compared with Alcoholic Extracts of Syphilitic Liver. 1. Of 155 serums in which a positive reaction was observed with both extracts, in 81 or 52.2 per cent. of cases the reactions were equal in both.

2. In 74 or 47.8 per cent. of cases the cholesterinized extracts gave a stronger reaction.

3. In no instance were the reactions negative with the cholesterinized and positive with the alcoholic extracts of syphilitic liver.

4. In 21 or 10.5 per cent. of 200 cases the reactions were positive with the cholesterinized extracts and negative with alcoholic extracts of syphilitic liver. These cases are worthy of further study and will be later considered in detail; here it may be stated that while the diagnoses were mostly made in the clinics and the patients were not directly under the observation of the authors, in at least 14 the history strongly suggested syphilis.

Antigenic Value of Cholesterinized Extracts as Compared with Extracts of Acetone-insoluble Lipoids. 1. Of 169 serums in which a positive reaction was observed with both extracts, in 120 or 71 per cent. of cases the reactions were equal in both.

2. In 48 or 28.4 per cent. of cases the cholesterinized extracts yielded stronger reactions.

3. In only one case (No. 233) the reaction with a cholesterinized extract was very slightly weaker than that observed with acetone-insoluble lipoids.

4. In no instance was a reaction negative with a cholesterinized extract and positive with acetone-insoluble lipoids.

5. In 21 cases or 10.5 per cent. the reactions were positive with a cholesterinized antigen and negative with acetone-insoluble lipoids.

In the majority of these the reactions occurred with the serums of persons in whom the history and findings were strongly suggestive of syphilis.

These results, which correspond quite closely with those pre-

viously reported by one of us[1] indicate the superior antigenic sensitiveness of cholesterinized antigens as compared with other extracts which are in common use.

It may be stated, therefore, that cholesterin appears to have a more marked affinity for the lipodophilic reagin or syphilis antibody than other lipodal substances and consequently is capable of absorbing or fixing complement with this antibody to a well-marked degree. The increased sensitiveness of reënforced antigens may be due in part to the antihemolytic activity of cholesterin in a manner comparable to the increased sensitivity of serums containing thermostabile anticomplementary bodies. Or if the Wassermann reaction is interpreted as a colloidal reaction, cholesterin may be regarded as peculiarly suited for the formation of new compounds with the syphilis antibody with consequent absorption of complement to a well-marked degree. Whatever may be the explanation, the fact remains as well proven that the addition of cholesterin to alcoholic extracts of normal organs and particularly of heart muscle, increases the antigenic sensitiveness of these extracts for syphilis antibody. The important question at issue, however, is in regard to the possibility of these reënforced extracts yielding false positive reactions with normal serums, that is, of their power to fix or absorb complement with some constituent of normal serum which is present to a well-marked degree in normal rabbit serum[2] and increased as a result of syphilitic infection. This is the point we have studied with particular interest.

Concerning the Specificity of the Wassermann Reaction with Cholesterinized Antigens. As just stated, most interest centres about the small percentage of cases which reacted only with the cholesterinized extracts. In practice these are the cases which give us most concern in the clinical interpretation of the reaction, especially when the degree of inhibition of hemolysis is slight. When there is 50 per cent. or more inhibition of hemo-

[1] Kolmer, J. A., Laubaugh, E. E., Casselman, A. J., and Williams, W. W., Archiv Int. Med., 1914, xii, 660.

[2] Kolmer, J. A., and Casselman, A. J., Jour. Med. Research, 1913, xxviii, No. 2, p. 369.

lysis with a cholesterinized extract we regard the reaction as positive even though the reactions with alcoholic extracts of syphilitic liver and acetone-insoluble lipoids are clearly negative.

The following is a list of cases from the Polyclinic Hospital and included in Table I which reacted only with cholesterinized extracts. Cases 234, 235, 236, 237, 238, and 239 were observed in the skin clinic of the Polyclinic Hospital under the eye of one of the authors.

Case 10.—W. E., aged forty-two years. Primary optic atrophy. Had an accident to one eye in childhood. At present has Argyl-Robertson pupil. The blood reaction is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+++	−	−

Case 25.—E. B., aged two years. Diagnosis: enuresis; hereditary syphilis. Nothing in family history suggestive of lues. Physical examination shows occipital and cervical lymphatic glands are palpable. Has ptosis of the right eye-lid. Has suspicious rash during winter.

	Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
July 27	++−+++	−	−

Report slightly positive.

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+++	−	−

Case 35.—S. B., aged twenty-one years. Diagnosis: tumor of breast. Nothing in history suggestive of syphilis. Patient has a mass in the breast that appeared to be tuberculous. The blood reaction is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+	−	−

Case 55.—M. C., aged sixty-eight years. Diagnosis: carcinoma of liver or cirrhosis of liver. Patient had failure of health four years previous to admission. Was married, had three children; all died in early life. One was stillborn; one died at age of one and a half years and one died at age of fifteen years. Causes not stated. Father had paralysis before he died. The blood reaction is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
++	−	−

Case 85.—H. S., aged two years. Infantile hemiplegia; nothing in history suggesting lues; present sickness came on with chills, fever, and convulsions, followed by a paralysis of left arm and leg; also could not speak. Regained power of speech but cannot walk. The blood reaction is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+	−	−

Case 106.—H. R., aged four years. Diagnosis: acute cardiac dilatation and chorea. Nothing in family history suggestive of lues. Mother had no miscarriages; no stillbirths. Physical examination shows that all the superficial lymphatic glands are enlarged and not tender. Present sickness began with a chill, fever, and pain in the wrists. The blood reaction is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+	−	−

Case 127.—T. M., aged fifty-eight years. Primary diagnosis: locomotor-ataxia; secondary diagnosis: gastritis. Patient denied any luetic infection. Nothing in history suggesting syphilis. (There was quite a dispute as to the diagnosis in this case.) Knee-jerks were quite suggestive of gastric crises. Tabes was the diagnosis severally suggested. The blood reaction is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+	−	−

Case 134.—A. M., aged fifty-six years. Primary diagnosis: acute dementia; secondary diagnosis: neurasthenia. Patient had eleven children, all dead but three; causes not stated. Patient complains of indefinite pain in all parts of her body. The blood reaction is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
++	–	–

Case 168.—S. G., aged forty-three years. Primary diagnosis: osteitis (luetic). The blood reaction is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+	–	–

Case 174.—R. G., aged nineteen years. Nothing whatsoever in history suggestive of lues. Patient suffering from nausea, loss of weight. Patient was put on protiodide on July 16, 1914, but no data as to results of the treatment. Girl has suspicious patches on tongue. The reaction of the blood is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver	Acetone-insoluble lipoids.
++++	–	–

Case 200.—E. H., aged twenty years. Diagnosis: psychosis. Nothing in history suggesting syphilis. Patient became melancholy for no apparent cause. Refused to talk, walk, or eat. Was afraid to be touched and refused all assistance. Was in the hospital but three days. A complete family history was not obtained. Right-sided paralysis. The blood reaction is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+	–	–

Case 201.—B. D., aged forty-two years. Diagnosis: chronic gastritis; arteriosclerosis. Pain in epigastrium for past year. Nausea and

sometimes vomiting. History of sore; enlarged epitrochlear glands. The blood reaction is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
++++	–	–

Case 205.—M. T., aged two months. Diagnosis: gastroenteritis and malnutrition. Child healthy at birth. Bottle fed. First birth. No history of lues. Mother states that child had blebs on soles of feet and palms of hands at birth. No skin eruption. At time patient was admitted there was a distinct shedding of the skin on the palmar and plantar surfaces. The blood reaction is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
++++	–	–

Case 207.—W. S., aged forty-five years. Diagnosis: carcinoma of stomach. Nothing whatsoever suggestive of syphilis in the history; however, there was no negative statement as to luetic infection. Pain in epigastrium. The blood reaction is as follows:

	Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
May 10, 1914	±	–	–

Report: negative.

	Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
May 12, 1914	±	–	–

Report: negative.

Case 214.—T. E., aged thirty-six years. Diagnosis: acute neuritis. Nothing in history or physical examination suggestive of syphilis. This patient was put on K.I. gr. VII t.i.d. and on the second day after taking medicine patient developed a severe coryza which quickly cleared up upon withdrawal of the drug. Pain in legs about course of anterior and posterior tibial nerves; weakness after standing. The blood reaction is as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+	–	–

CASE 234.—I. A., aged ten years. Lues hereditaria. Patient has extensive ulcerative and vegetative lesions on the right arm and hand. His serum reaction was:

Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
±	–	–

Under appropriate specific treatment a striking improvement in the eruption was brought about.

CASE 235.—F. McL., aged fifty years. Was treated several years ago for a squamous syphilide of the palm of the hand. Has been under internal treatment for some years. On April 10, 1914, his reaction was as follows:

Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+	–	–

CASE 236.—Mrs. K. Developed an initial lesion on the lip in April, 1913. Husband is being treated for lues. This patient has had salvarsan and mercurial inunctions. Her serum reactions are as follows:

	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
June 29, 1914	+	– (D. H.)	–
September 16, 1914	++	–	+

CASE 237.—G. R., aged fifty-nine years. Slight treatment at the dispensary for pruritus of the genitalia. It was noticed that he had luetic scars on the forehead and blood was taken for a Wassermann reaction.

Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+	–	–

CASE 238.—P. McG., aged forty-four years, presented himself with an eruption upon the lower lip of suspicious character. Duration two years. His Wassermann reaction yielded the following result:

Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+++	–	–

CASE 239.—S. M., aged thirty years. Patient has been under observation with a rebellious and severe sycosis vulgaris involving the cheeks, chin, and lip. There is no history of lues and the patient's general health is good. On April 2, 1914 his serum reacted as follows:

Cholesterinized beef heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+	– (D. H.)	– (D.H.)

In this case we are not persuaded that the reaction indicates lues; the possibility of a latent lues hereditaria, however, can never be quite eliminated, and the interpretation of the reaction in this patient must remain open.

The list above given representing ambulatory hospital patients might readily contain inaccuracies of diagnosis such as not infrequently occur in dispensary practice. It will, perhaps, be more valuable therefore to study a series of patients in private practice. Below is appended a list of 20 such patients who have been under the observation of one of the authors for from one to six years. All of these patients are luetic subjects and multiple serological tests have been made on practically all. These patients have shown at times a positive Wassermann reaction with the alcoholic extracts of syphilitic liver and an extract of acetone-insoluble lipoids, but have at other times been negative with these and positive only with the cholesterinized antigens. The persistence of negative Wassermann in these cases would have suggested an extinction of the spirochetic infection and consequent cessation of treatment, had not the cholesterinized antigen been employed. Most of these patients were in the secondary and tertiary stages. Some of these patients after exhibiting positive reactions only with the cholesterinized antigens later gave frank positives with an alcoholic extract of syphilitic liver. One patient with a four-year-old infection had had several negative Wassermanns reported by a competent serologist. He presented himself for treatment with an annular nodular eruption upon the side of the chin; he was much surprised and shocked when he was informed that the patch was syphilitic,

for he was hopeful that he had been cured. A blood test was again made and was negative with alcoholic extract of syphilitic liver, but weakly positive with the extract of syphilitic liver and strongly positive with the cholesterinized extracts, and intravenous injection of salvarsan effected a rapid disappearance of the patch.

A brief history of these cases is appended:

Case 1.—J. W., aged thirty-two years. Infection in 1901. Treated by his physician with internal remedies for two years. He has since July, 1913, received ten intravenous injections of salvarsan and neosalvarsan and a course of gray oil injections and is entirely free of any manifestations of disease. The record of his blood test is as follows:

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
December 30, 1913	±	+	−	−
February 11, 1914	+++	−	+ to ++	±
April 27, 1914	++ to +++	.....	−(D. H.)	−
June 13, 1914	−	−	−(D. H.)	+
September 6, 1914	++ to +++	−	±	.....

It will here be seen that when the patient came first under observation the serum test with the alcoholic extract of syphilitic liver and acetone-insoluble lipoids was negative, with positive reactions only with the cholesterinized extracts. As indicating that the latter tests meant spirochetic activity, the tests later became positive with the other antigens.

Case 2.—W. S., aged fifty-five years. Infection dates back to early manhood. Patient has arteriosclerosis. Wife treated ten years ago for placques on tongue. The record of the serum test is as follows:

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
March 4, 1911	....	....	Weak +	Weak +
September 26, 1911	....	....	++	++
November 24, 1911	....	....	−	±
May 23, 1912	....	....	+	+
October 23, 1912	....	....	+	++
March 14, 1913	....	....	−	−
May 8, 1913	....	....	−	−
June 12, 1913	+	+	−	±
November 13, 1913	+	±	−	−
June 24, 1914	+++	....	−	−

This patient has had seven intravenous injections of salvarsan and neosalvarsan, in addition he received mercurial injections. His health has been much improved. The five tests above indicated which are negative with the alcoholic extract of syphilitic liver do not persuade us that infection is eradicated.

Case 3.—J. K., aged thirty-three years. Infection dates back five years. Had an entirely inadequate treatment during the secondary period. Patient came under the care of one of the authors in December, 1912. A blood test taken about three weeks after the cessation of mercurial inunctions was negative. The serum reactions are herewith appended:

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver	Acetone-insoluble lipoids.
December 2, 1912	....	....	−	....
September 27, 1913	++++	++++	++++	++++
April 7, 1914	+++	−	−	−
June 27, 1914	++	....	+	+

The first test when the patient came under our observation was made by a very competent serologist in this city; it doubtless had been influenced by the preceding treatment. The patient received while under our care thirteen gray-oil injections, five intravenous injections of neosalvarsan and other treatment.

Case 4.—S. H., aged thirty-two years. Had a suspicious sore three years ago, the nature of which was not determined by his physician at that time. The patient came under observation in the autumn of 1913, at which time he had numerous ulcerative lesions on the thighs and legs. His blood reactions were as follows:

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver	Acetone-insoluble lipoids.
October 21, 1913	++++	++++	++++	++++
March 24, 1914	+	+	−	−
June 2, 1914	++	++	−	−

The ulcerations healed up under two intravenous injections of neosalvarsan. The patient received in all eight intravenous injections of neosalvarsan and salvarsan and eight gray-oil injections. He is at present free of symptoms, but is still under treatment.

Case 5.—F. G., aged twenty-six years. Had an initial lesion followed by atypical secondaries in June, 1912. Received mercurial inunctions and other treatment.

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
March 5, 1913	....	....	–	–
September 13, 1913	++++	++++	+++	+++
March 10, 1914	–	....	–	–
May 5, 1914	–	....	–	–
July 19, 1914	++	....	–	–

On September 19, 1913, he received 0.45 grams salvarsan intravenously, a second dose on September 28, 1913, and third on October 3, 1913; this was followed by a course of gray-oil injections. Salvarsan intravenously on July 15, 1914 and July 22, 1914. The patient is free of symptoms.

Case 6.—S. F., aged five years. Father treated for affection some years ago; child has mild degree of luetic cachexia; no florid symptoms. The blood reactions are as follows:

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
February 2, 1911	....	....	–	+ faint
May 23, 1911	....	....	–	....
September 7, 1911	....	....	–	....
September 27, 1911: while taking KI and Hg. bichlor.	....	....	+	+

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
December 2, 1912	±	±	–	–
September 16, 1913	–	–	–	–
November 14, 1913	–	–	–	–
February 11, 1914	–	–	–	–

On May 21, 1914 the luetin test was slightly positive.

From October 9, 1911, to September 18, 1914, this patient received nineteen gluteal injections, each containing 100 milligrams of salvarsan in oil.

Case 7.—Miss H., aged thirty years; luetic infection in 1909. No active symptoms during past three years. Had a positive Wassermann before presenting herself for treatment. Received intravenous injections of salvarsan on March 27, 1913, April 7, 1913, October 27, 1913, and

November 10, 1913 in addition to other treatment. On October 1, 1913, serum test was:

Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver	Acetone-insoluble lipoids.
+	+	–	–

The patient is free of symptoms of lues.

Case 8.—Mrs. S., wife of patient (Case 2). Had persistent placques on tongue over ten years ago.

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
May 19, 1913	....	....	–	–

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
November 11, 1913	–	– –	–	–

The patient received salvarsan and gray-oil injections, after which her reaction became negative with all antigens.

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver	Acetone-insoluble lipoids.
April 14, 1914	–	–	–	–

Case 9.—W. C., aged thirty-six years. Initial lesion four years ago. Treated by his physician with pills for two years. He then had several negative Wassermann reactions. In the late Spring of 1914 he developed an annulo-nodular patch upon the side of the chin which was readily diagnosed as a syphilis. His blood at this time gave the following reaction:

		Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
May 21, 1914	....	– – –	–	–

An intravenous injection of salvarsan effected a disappearance of the patch; this was followed by two other injections; later the reaction with the alcoholic extract of syphilitic liver became positive.

		Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
June 27, 1914	....	– –	–	–
September 18, 1914	....	– – – –	–	– – – –

The patient is now free of symptoms.

CASE 10.—P. V., aged fifty-five years. Infected at age of twenty-eight. Very little early treatment. Later extensive ulcerations of leg. Treatment by mouth then given for three years by patient's physician. This patient had some neuritic pains in arm. On April 27, 1914, his blood showed the following:

Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
–	–	–

He was then given three intravenous injections of salvarsan; two months later the reactions were as follows:

	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
June 24, 1914	– – – –	–	–

Since this time further treatment has been instituted.

CASE 11.—F. S., aged forty years. Infection at age of twenty-one years. Insufficient early treatment. The patient has premature arterial fibrosis. He has had five intravenous injections of salvarsan, gray-oil, and cacodylate of mercury and other treatment. He has had negative serum reactions on a number of occasions only to be followed by a swing to a positive reaction. The reactions for the past two years are herewith appended:

	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
February 19, 1913	....	–	–
April 4, 1913	....	–	–
June 17, 1913	+	–	–
November 11, 1913	±	–	–
February 1, 1914	+	–	–
May 4, 1914	–	–	–
July 11, 1914	+++	–	–
September 28, 1914	–	–	–

It will be seen that the alcoholic extract of syphilitic liver and the acetone-insoluble lipoids have given negative reactions for over a year, but with the cholesterinized antigens the serum has given positive reactions from time to time. In support of the contention that the latter indicates that the spirochetal infection is not extinguished may be cited

the fact that on March 20, 1914, after the Wassermann had been negative for almost a year, there was a strongly positive luetin reaction and that on May 7, 1914, the luetin reaction was again positive, although this time the lesion did not go on to pustulation.

Case 12.—H. G., aged forty-two years; infected over twenty years ago. Inadequate early treatment. Patient has arterial changes, loss of sexual power, and certain other symptoms suggestive of incipient paresis. The complement-fixation test on September 14, 1914, was as follows:

Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
++ to +++	–	–

Several intravenous injections of salvarsan have greatly improved the patient's condition.

Case 13.—A. F., aged thirty-eight years; infection seven years ago. Has been thoroughly treated by salvarsan and mercurial injections. On June 4, 1913 the serum reaction was:

Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids
–	–	–	–

Case 14.—J. K., a college student, aged twenty-two years; infected six years ago. On October 12, 1912, the complement-fixation test was as follows:

Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
– – – –	– – – –

After treatment the reaction became negative on March 20, 1913.

On June 6, 1913, the following reaction was obtained:

Cholesterinized guinea-pig heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
–	–	–	–

The patient did not return for treatment; in the Autumn of 1913 he entered a Western University; his blood examined at that time was frankly positive with the alcoholic extract of syphilitic liver, according to a communication received from one of the professors in this institution.

CASE 15.—Dr. X., aged thirty years. Digital chancre three years ago. Intravenous injections of salvarsan and other treatment. On February 28, 1912, the serum reaction was:

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
February 28, 1912	....	....	+	+
May 9, 1912	....	....	+++	+++
June 25, 1912	....	....	±	+
October 24, 1912	....	....	Weak +	Weak +
December 8, 1913	....	....	−	±
February 24, 1913	....	....	Weak +	Weak +
June 30, 1913	−	−	−	−
October 14, 1913	+++	++	+	±
January 4, 1914	−	−	−	−
February 11, 1914	±	−	−	−
May 4, 1914	....	−	−	−

Treatment was continued as long as positive reactions were obtained.

CASE 16.—Mrs. A., aged forty-five years. Infection fifteen years ago. Had tertiary ulcerative lesions on elbow when she first came under observation. The patient was treated by salvarsan intravenously and mercury iodides by mouth.

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
January 19, 1914	++	+ to ++	−	−

The patient lived out of town and did not continue the treatment after the above test was made. The reaction, however, indicates the need of further treatment.

CASE 17.—A. H., aged fifty-three years. Infection sixteen years ago. Patient presented himself with a tertiary ulceration of cheek. Intravenous injections of salvarsan and internal treatment.

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
November 11, 1913	+	−	−	−

The patient has not returned for treatment since the above test was made.

CASE 18.—Mrs. W., aged thirty years. Husband treated for lues. Anemia and failure of health. This patient has been treated with salvarsan and mercury. The serum reactions are as follows:

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
November 2, 1911	....	....	±	+
November 15, 1912	....	....	±	Weak +
November 25, 1913	± to +	−	−	−
April 8, 1914	....	....	−	−

CASE 19.—M. G., aged forty-eight years. Infected twenty years ago; early treatment inadequate. Recently treated by salvarsan and mercury.

	Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
October 22, 1913	−	+ to ++	−	−
June 24, 1914	−	....	−	−

CASE 20.—Mrs. C., aged forty-eight years. No history of lues. Has had several years recurrent sores in mouth. The serum reaction was as follows:

Cholesterinized beef heart.	Cholesterinized human heart.	Alcoholic extract of syphilitic liver.	Acetone-insoluble lipoids.
+	+	−	−

A gluteal injection of salvarsan was followed by marked improvement.

Of these 41 cases, no less than 20 were known to be definitely syphilitic and in at least 14 others the diagnosis of lues was most probable. In other words, in 34 or about 83 per cent. of these cases the positive reactions with the cholesterinized extract were in all probability correct and an expression of continued spirochetal activity. What is of great importance is the fact that if these extracts had not been used either a diagnosis of syphilis would not have been made or treatment would have been interrupted before spirochetal activity had ce ased.

In 7 cases, however, the reactions were negative with an alcoholic extract of syphilitic liver and acetone-insoluble lipoids but weakly

positive with cholesterinized heart extracts. In none of these cases, as far as the available records are concerned, was there clinical evidence of syphilis, although the dispensary physicians did not record careful family histories with the possibility of congenital syphilis in mind.

These cases are typical of the difficulties of interpretation of the Wassermann reaction with cholesterinized extracts. All weakly positive reactions with these antigens cannot be disregarded, for there is a possibility that such reactions are true positive reactions. Especially is this true of cases of syphilis under treatment and also of cases of latent tertiary syphilis.

Not infrequently serums are encountered which react strongly positive with cholesterinized extracts and negatively with alcoholic extracts of syphilitic liver and acetone-insoluble lipoids. We have found that these are almost invariably from luetic persons and have learned by experience to interpret them as positive reactions. The chief difficulty is with serums which react weakly with cholesterinized extracts and negatively with plain extracts. According to our experience most of these are from luetic persons and the reactions are to be regarded as positive; but this at the present time cannot be claimed for all such reactions, so the result must be interpreted in the light of the history of symptoms and a physical examination. If there is a reasonable suspicion of syphilis we have found it well to administer antiluetic treatment, as in several instances persons yielding these doubtful reactions have shown marked improvement in their clinical condition, followed in some instances by a stronger Wassermann reaction.

This is called a "provocative" reaction and is similar to the clinical Jarisch-Herxheimer reaction. We may state that an extended experience with cholesterinized extracts has steadily increased our confidence in their value; we desire, however, to make a reservation concerning the possibility of cholesterinized extracts delaying hemolysis or even yielding weakly positive reactions with the serums of persons who are apparently nonsyphilitic.

In the presence of such a reaction, namely, a weak positive with a cholesterinized extract and clear negative with alcoholic extract of syphilitic liver and acetone-insoluble lipoids, the result should be interpreted according to the history and clinical symptoms of the patient. If the history is suggestive of lues the reaction should in the interests of the patient be interpreted as a positive; if the patient is a luetic subject under treatment, further treatment is indicated. In a number of instances of such reactions in persons in whom infection was denied, marked clinical improvement followed the administration of salvarsan and mercury.

Concerning the Question of Pseudo-reactions with Cholesterinized Antigens. In a previous paper one of us had directed attention to the possibility of obtaining weakly positive reactions of 10 per cent. or less inhibition of hemolysis with 5 to 10 per cent. normal serums. At that time we were using with the cholesterinized extracts a hemolytic system which did not permit of a sufficient excess of complement or hemolytic amboceptor to overcome the increased antihemolytic action of these extracts due to the presence of so much cholesterin. As already pointed out it is necessary to carefully standardize the antigen and to use no more than necessary and to use more than a single unit of complement or hemolytic amboceptor.

Of the serums of 434 persons submitted for Wassermann reaction and included in this study, 214 reacted negatively with all antigens including the cholesterinized extracts. It is possible that some of these were luetic but the number of negative reactions with cholesterinized antigens and the serums of persons who were apparently healthy or showing no signs of the disease and with a negative history of infection is such as tends to minimize the likelihood of false positive reactions with these extracts.

In 7 out of 41 reacting only with cholesterinized extracts there was no adequate evidence of syphilis, but as already stated there was no rigid inquiry made as to the family history by the dispensary physicians who sent the blood for diagnosis, and the possibility of a latent infection cannot be absolutely set aside. We do not feel justified in regarding these cases as luetic but a final

judgment as to the interpretation of such reactions must be left to the future.

THE USE OF CHOLESTERINIZED ANTIGEN IN THE WASSERMANN REACTION AS A THERAPEUTIC GUIDE. We hold that the alcoholic extract of syphilitic liver, the usual antigen employed in the Wassermann reaction, is not sufficiently sensitive to detect minute amounts of "reagin" in the blood. Many reactions are reported as negative with this antigen in which the use of cholesterinized antigens gives positive reactions. That in the vast majority of cases these latter positives indicate spirochetic activity, we believe is proven by the accompanying case reports. In patients known to have had syphilis, positives with cholesterinized antigens definitely demonstrate that the patient is not cured.

The interpretation of weak positive reactions with the cholesterinized antigens and negative with luetic liver extract will depend somewhat upon collateral evidence. Where the patient is known to have had syphilis, weak positives with cholesterinized extracts, to our minds, indicate the persistence of spirochetic activity. This opinion is based (1) upon the fact that some of these patients, particularly when treatment is interrupted, will later show frank positives with other antigens; (2) that some patients with obvious luetic lesions present such serum reactions; (3) that some of our patients with such reactions have given positive luetin reactions; (4) that certain patients with such reactions, exhibiting no definite syphilitic manifestations, but such symptoms as anemia, failure of health, ocular or nervous diseases of undetermined character, respond often in a surprising manner to specific treatment, and (5) finally, that the persistence of specific treatment in patients with weak positives with cholesterinized extracts, will often extinguish such reactions. One of the authors has had 25 luetic patients in whom he was able to secure a negative reaction with all antigens employed.

It is obvious that when the "reagin" in the blood has been reduced to a point where it is no longer discoverable by the use of luetic liver extracts but only by more sensitive antigens, the patient is in the best position to have his infection eradicated,

provided treatment is not suspended. This is a practical consideration upon which we wish to place emphasis.

A luetic person under treatment will react negatively with alcoholic extracts of syphilitic liver and acetone-insoluble lipoids for some time before the reaction becomes negative with cholesterinized extracts. In other words, it requires more treatment to extinguish a reaction with reënforced antigens than with plain extracts. We have several reasons for believing that treatment should be continued as long as the serum reaction with cholesterinized antigens remains positive to the slightest degree and a number of our cases in private practice have proven that with sufficient treatment the reaction may be rendered negative with all antigens. We have had several "Wassermann fast" patients whose serum reactions cannot be altered by persistent or rigorous treatment. One patient with an old lues has received 19 injections of salvarsan and neosalvarsan in addition to other treatment and still has a ++++ reaction. Such cases usually react positively with all antigens but rather more strongly with the cholesterinized than the plain extracts.

Discussion. Not infrequently the statement is made that the diagnosis of syphilis should never be made in the laboratory. In not a small proportion of cases, however, especially cases of latent and hereditary syphilis the diagnosis cannot be made otherwise. Indeed, the Wassermann reaction has its chief usefulness in this class of cases. Persons may be sincere in denying knowledge of infection and the symptoms may be of such an indefinite character as to make a clinical diagnosis impossible. It is generally conceded that the Wassermann reaction serves as an important guide to treatment; this is based upon the assumption that a positive reaction indicates the presence of living spirochetes within the tissues, although these may not be sufficiently active or numerous or so situated as to produce obvious symptoms.

With these considerations in mind it may be granted that the reaction should be made as delicate as is possible within the limits of specificity. In the diagnosis of syphilis by the Wassermann

reaction every possible precaution should be taken in the technique to avoid error. Such a diagnosis, pregnant as it is with the infliction of mental suffering and at times domestic unhappiness, should be made only after the establishing of conclusive laboratory evidence or after a mature consideration of conjoint laboratory and clinical data. In doubtful cases it is better to err on the side of announcing the reaction as negative. The physician submitting the blood for diagnosis should, however, receive a supplementary statement to the effect that the absence of syphilis cannot be conclusively demonstrated, and, that any suspicious symptoms should be submitted to the therapeutic test.

In using the reaction as a guide to treatment the technique should be as delicate as is compatible with specificity in order to detect the minutest amounts of antibody present. The persistence of ever so few living spirochetes in the body may later give rise to serious manifestations.

According to our experience cholesterinized antigens are the most delicate with which we are acquainted. A negative reaction with a good cholesterinized extract as antigen excludes syphilis more definitely than is possible with any other extract. Furthermore, this antigen will detect a larger proportion of latent luetic infections than any other antigen. Cholesterinized antigens necessitate more prolonged and more thorough treatment of syphilitics than when plain antigens are used in the technique. All of these are advantages, as they tend to more accuracy in diagnosis and greater thoroughness in treatment.

It is to be emphasized, however, that this delicacy renders these antigens dangerous in inexperienced hands. They must be frequently and carefully tested and standardized and used with a hemolytic system embracing more than a single unit of complement and amboceptor. After an experience of a number of years with all of the better-known extracts, we would hesitate to report upon a Wassermann reaction unless at least one satisfactory cholesterinized extract was used as an antigen in the test.

Conclusions.—1. Cholesterinized alcoholic extracts of normal heart constitute more sensitive antigen in the Wassermann

reaction than alcoholic extracts of syphilitic liver and extracts of acetone-insoluble lipoids. The latter extracts are superior to alcoholic extracts of syphilitic liver and rank second to the cholesterinized extracts in antigenic sensitiveness.

2. Of 41 cases reacting only with cholesterinized antigens no less than 20 were known definitely to be syphilitic and in at least 14 the diagnosis of lues was most probable. In other words, in 34 or about 83 per cent. of the cases the positive reactions with the cholesterinized extracts were in all probability correct and an expression of continued spirochetal activity even though the reactions with alcoholic extracts of syphilitic liver and acetone-insoluble lipoids were negative. What is of great importance is the fact that if these extracts had not been used either a diagnosis of syphilis would not have been made or treatment would have been interrupted before spirochetal activity had ceased.

3. We are of the opinion that cholesterinized extracts are best employed in conjunction with non-cholesterinized extracts in performing the Wassermann reaction and very slight positive reactions with the cholesterinized extracts should be interpreted in conjunction with a clinical study of the patient. With a person known to be syphilitic these slight reactions are to be interpreted as positive and as an indication for further treatment.

4. The large number of negative reactions with cholesterinized antigens and the serums of persons in good health or those known to be suffering from non-luetic conditions is evidence that false positive or pseudo-reactions with these extracts are rare.

5. In using cholesterinized antigens it is not advisable to work with single units of complement and amboceptor because of the well-known antihemolytic properties of cholesterin, and the corresponding increased likelihood of obtaining false reaction.

6. Cholesterinized alcoholic extracts of heart are easily prepared and are quite stable. It is advisable, however, to re-titrate them at frequent intervals as is usual with other antigens.

7. Cholesterinized alcoholic extracts of human heart are probably better than those of beef and guinea-pig heart. The latter extracts are particularly prone to become anticomplementary.

8. Cholesterinized extracts constitute the best antigens when the treatment of syphilis is being guided by the Wassermann reaction, because they are the most delicate and serve to indicate spirochetal activity after the reactions with alcoholic extracts of syphilitic liver have become negative. It requires more treatment to extinguish the Wassermann reaction when cholesterinized extracts are employed; this result, however, can be achieved, and when the reactions so performed continue to be negative, the test constitutes the best evidence of the cure of syphilis that we possess.

DISCUSSION

Dr. B. A. Thomas: This is a matter of considerable importance to physicians, and I think it worth while to present the other side of the subject, namely, from the stand-point of the alcoholic extract of syphilitic liver. In view of our experience on 3000 Wassermann reactions in a certain proportion of cases—only a very few hundred in number—a comparative study has been made with respect to the two antigens, alcoholic extract of syphilitic liver and cholesterinized extracts, we have come to place greatest reliance upon the syphilitic liver extract as No. 1 in importance and the cholesterinized antigens as No. 2. Our recent work with the cholesterinized extracts as compared with the syphilitic liver extracts has been confirmatory of results previously reported in an article written by Dr. Ivy and myself, and which I can do no better than to read in *résumé* at the present time.

It is a matter of very careful study, if not dangerous interpretation, when you call a person syphilitic dependent upon a weak, medium, or strong cholesterinized antigen reaction. I would like to ask Dr. Schamberg and Dr. Kolmer, in view of the fact that they themselves have admitted that 10 per cent. of cases clinically negative will give a positive reaction, how they can claim that as a governor of treatment the cholesterinized antigens can be of great value in controlling the duration of that treatment?

The cholesterinized guinea-pig heart extract was used by us along with our own antigen of alcoholic extract of syphilitic fetal liver in the routine examination of 100 cases, the cholesterinized human heart extract being employed in 33 cases. These investigations covered a period

of several weeks. We may say that the differences in results with the three antigens were no more marked at the end of the period during which these comparative tests were made than at the beginning, so that they cannot be ascribed to deterioration of the extracts. Careful titrations of the antigens were carried out before doing the tests, and at no time was more than one-third of the anticomplementary dose used. The comparative results with syphilitic liver extract and cholesterinized guinea-pig heart extract may be divided into four groups as follows:

1. In 22 cases the results were positive with both antigens, and showed little or no difference in the degree of reaction.

2. In 8 cases the syphilitic liver extract gave a weakly positive reaction, while the cholesterinized extract gave a stronger reaction.

3. In 36 cases both antigens gave a negative result.

4. In 34 cases the syphilitic liver extract gave a negative reaction, while the cholesterinized heart extract gave a weakly positive or medium positive result. This is naturally the most important group from the clinical stand-point, 9 of these 34 cases were treated cases of syphilis exhibiting no symptoms, showing that it is more difficult to render the serum negative to the cholesterinized extract by antisyphilitic treatment than to the syphilitic liver extract. The remaining 25 of this group were cases submitted for diagnosis or who had no signs or history of syphilis. Where one antigen reacted more strongly than the other, it was always the cholesterinized heart extract. In no case did the syphilitic liver extract give a stronger reaction than the cholesterinized extract.

In the comparative tests with the cholesterinized extract of human heart, of 33 cases there were 6 in the first group, *i.e.*, equally positive with the two extracts; 4 in the second group, in which the cholesterinized extract gave a distinctly stronger reaction than the syphilitic liver antigen; 16 in the third group, in which both antigens gave negative results; 7 in the fourth group, which were negative with the syphilitic antigen, but positive with the cholesterinized heart extract.

In the first series, therefore, the results with the two antigens disagreed in 42 out of 100 cases, and in the second series in 11 out of 33 cases. We see from this that the cholesterinized extracts gave apparently a more "delicate" reaction than the extract of syphilitic liver, but we also found that many weakly positive results were obtained by the former in non-syphilitic cases. This last fact alone is quite sufficient in our opinion to offset any advantage in delicacy of the reaction obtained with the use of cholesterinized extracts. We feel that just as high a percentage of positive results is obtained in known or clinically apparent syphilitics with a good syphilitic liver extract as with the cholesterinized antigens, and we do not get positive results with non-

syphilitic sera. This is doubtless due in part to the use of one unit of complement and amboceptor properly standardized, instead of double or triple units as employed by many workers. We must conclude that with cholesterinized antigens, weakly and medium positive, and occasionally strongly positive reactions, may be obtained in many conditions other than syphilis, and in normal persons. While our experience with the use of cholesterinized extracts is limited, and we have no criticism to make of the commendable experimental studies being carried on for the improvement of the Wassermann technique, we regard the employment of these artificial antigens for routine clinical use at the present time, instead of being an advance in serological technique, as a distinct step backward. Kolmer and his associates state that 10 per cent. of normal sera may yield weak positive reactions with cholesterinized extracts. If therefore the results of the reaction with these extracts cannot be relied upon in a considerable percentage of cases, we see no advantage in employing them along with syphilitic liver extract. We claim that with syphilitic liver, using the technique described, weakly positive reactions mean nothing else but syphilis. Even granting for a moment that the cholesterinized antigens give a more delicate reaction, and may furnish positive results occasionally in cases of syphilis that are negative to the syphilitic liver extract, it is a very much less serious error to overlook an occasional case of syphilis, than to saddle a diagnosis of the disease, with all it entails, upon a patient who does not have syphilis. Considerable harm is being done at the present time by the use of unreliable non-specific or artificial extracts, in two ways: (1) The marked discrepancies between the results of the Wassermann test and the clinical findings in many cases are causing skeptical clinicians to lose confidence in the value of the reaction, and thus they are being deprived of an important diagnostic and therapeutic aid; (2) a great many unfortunate people are being treated for syphilis who have not and who never had syphilis, as the result of weakly positive and doubtful reports by workers using these antigens."

It has been my experience that in patients strongly suspected of having syphilis, though occasionally giving negative results and particularly if they have been under treatment in the past, an appropriate small dose of salvarsan or neosalvarsan will produce a provocative reaction in every instance.

Dr. Schamberg, closing: Dr. Thomas admits the greater sensitiveness of the cholesterinized antigens as compared with the alcoholic extract of syphilitic liver. He claims, however, that with these antigens one obtains frequently positive reactions in normal subjects. That is the important point for discussion. The reading of our communica-

tion with the case histories will demonstrate that in a large series of patients known to have had lues, the occurrence of positive cholesterin reactions with negative reactions with the ordinary antigens, indicated the persistence of the infection. Dr. Kolmer and I believe that when we have a 50 per cent. fixation of complement with the cholesterinized antigens we may definitely assert the existence of syphilis. When we come to that small group of cases in which we have a reaction weakly positive with cholesterinized antigens and negative with the alcoholic extract of syphilitic liver, we have a group concerning which it is impossible to speak dogmatically. We do not assert that these patients are luetic. On the other hand, we are not in a position to state that they are not luetic. It is a difficult matter to prove on clinical grounds that an individual does not harbor spirochetes within him. Fournier observed many years ago that lues hereditaria could persist for forty years before exhibiting manifestations. His observations are being confirmed at the present time. It would be hazardous to state absolutely that there was no syphilitic infection in an individual because of the absence of obvious symptoms.

The reading of very weak positive reactions with the more sensitive antigens must, however, in the light of our present knowledge, be guided somewhat by collateral evidence. If there is no evidence of syphilis, then we do not interpret these weak reactions as positive.

I feel that it is a great mistake for physicians to fail to take advantage of the use of the cholesterinized antigens. Persons who are suffering from syphilis would, without their employment, be prematurely regarded as having secured a negative Wassermann reaction and treatment would be apt to be interrupted when the patient was in the best position to have spirochetic infection extinguished.

Dr. John A. Kolmer: Probably Dr. Thomas was referring to my previous communication on cholesterinized extracts in which attention was drawn to 5 to 10 per cent. positive reactions with the serums of normal persons. I believe these results were due to the error of using single units of complement and amboceptor such as also Dr. Thomas and Dr. Ivy used in their work and which I believe explains their pseudo reactions. As I have pointed out, it is necessary to use more than one unit of complement or amboceptor in order to avoid the antihemolytic action of cholesterin. This is an important point in technique worthy of emphasis. The antigens used by Drs. Thomas and Ivy in the work which they reported were furnished by me. One of these, the extract of guinea-pig heart, soon became so anticomplementary that I could not use it in my own work.

FRACTURE OF THE CAPITELLUM[1]

By JOHN H. JOPSON, M.D.

In the discussion of the operative treatment of fractures in general, especially of those involving the joints, the advisability of operation is one which permits the exercise of discretion on the part of the surgeon when dealing with individual cases.

It may be well to draw attention to one of the rarer varieties of elbow fracture which calls so imperatively for operative intervention that the opinion of those who have encountered it in their practice is practically unanimous that no other method of treatment can be relied on to give a satisfactory functional result. By this we mean fracture of the capitellum.

It is true that fracture of this portion of the lower end of the humerus is of infrequent occurrence, but, having recently had a case in our own practice, we think it worth while to place it on record along with others of a similar nature.

The capitellum is that portion of the external condyle of the humerus which is covered with cartilage and articulates with the head of the radius. The following description of the capitellum or capitulum, or eminentia capitata, as it is sometimes styled, is taken from Piersol's *Human Anatomy:*

"The capitellum, on which the concave head of the radius plays, is situated on the front of the outer part of the lower end. It is not far from being a portion of a sphere, since it is convex and nearly equally so in all directions, but the arc from above downward is the longest. A groove runs between it and the outer ridge of the trochlea; the outer border is straight; the posterior runs from it obliquely backward and inward. The capitellum is placed so much to the front as to be nearly or quite invisible

[1] Read October 7, 1915.

from behind; hence the articular surface is much more extensive on the front than on the back. The radial fossa, a small depression above the capitellum, receives the edge of the head of the radius in extreme flexion."

Our case was that of T. V., male, 38 years, who, on September 28, 1913, fell, while running across the street, and struck himself, he thinks, upon the left elbow. The accident was followed by severe pain in the arm and disability of the limb. When examined by us an hour later he was suffering great pain and there was slight swelling in the region of the joint, with crepitation over the radiohumeral articulation on supination and pronation of the forearm. Pain was severe during this manipulation, and also on flexion and extension. There was slight increase in lateral mobility of the joint, but no displacement of condyles or olecranon could be detected.

The arm was dressed on an anterior angular splint, in spite of which the patient suffered great pain all night; when dressed next day, moderate swelling was present. The following day an *x*-ray was made at the University Hospital by Dr. Graves, and a fracture of the capitellum was found. In a lateral view the capitellum was seen to be separated from the humerus at its base, the line of fracture being quite horizontal, and the fragment was rotated forward and upward as if hinged at its anterior margin, so that the articular surface looked upward and forward, the fractured surface downward and backward (Fig. 1).

In the anteroposterior view the fracture was less conspicuous; but the picture showed absence of involvement of the trochlea (Fig. 2). An internal splint was substituted for the anterior angular splint. No attempt was made at reduction, but the patient was advised that an operation would be necessary. The change of position in the forearm was followed by material relief from the severe pain. He was operated on October 3, 1913, Dr. Ashhurst assisting. The joint was opened through Kocher's external incision, which gave a most excellent exposure (Figs. 3 and 4). A couple of very small fragments were removed from the surface of the condyle, and the main fragment, still adherent

by its anterior edge to the anterior surface of the condyle, was easily turned back into place. No attempt was made to attach

Fig. 1.—Fracture of the capitellum (lateral view).

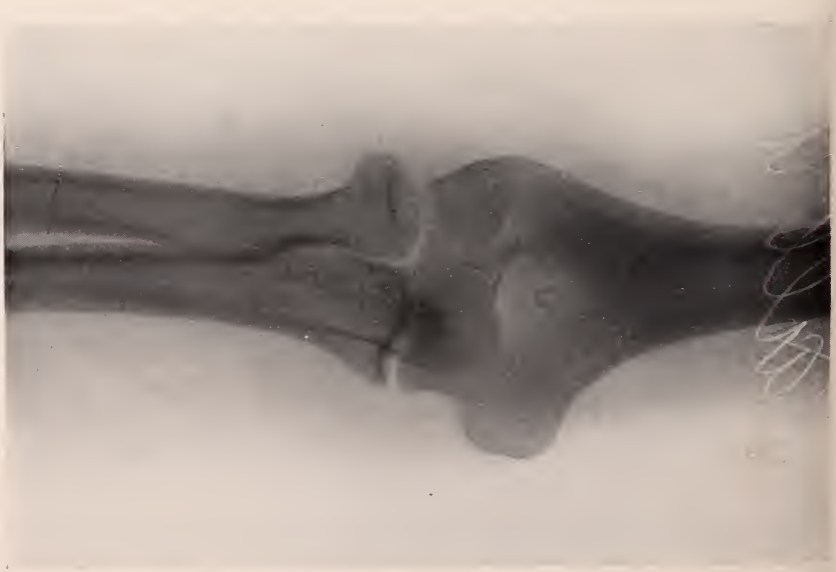

Fig. 2.—Fracture of the capitellum (anteroposterior view).

it by sutures, as it was held firmly in place when the forearm was put in Jones's position. The capsule was sutured and the wound

Fig. 3.—Kocher external incision.

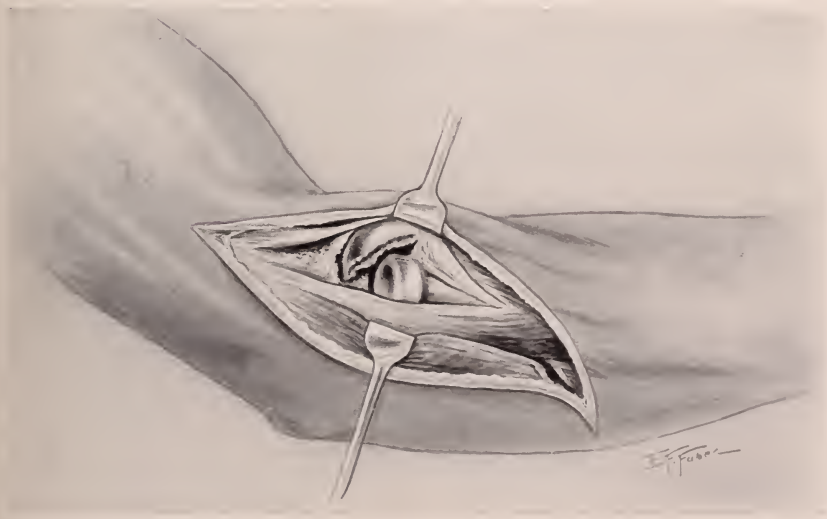

Fig. 4.—Exposed joint.

closed without drainage, the arm being dressed in acute flexion suspended from the neck.

The patient suffered considerable pain, especially at night, for some days after the operation, but this gradually subsided. Primary union was obtained, except at one point, where a small stitch abscess formed, but it healed quickly after being opened. The Jones's position was maintained for twenty-six days, when the arm was dropped to a right angle, and, after a couple of weeks in this position, the patient was encouraged to use it. There was a rapid return of motion, especially flexion, and by the middle of November it was noted the patient was able to extend the arm to about 130 degrees. Supination and pronation were perfect, and he could play the piano. When seen on December 22, 1913, the functional recovery was complete, except that extension was still stopped at about 165 degrees, or 15 degrees less than the straight line. No pain and no inconvenience were present at this time. Some contraction of the capsule in the line of incision apparently holds the arm from complete extension, but this will doubtless be overcome in time.

It is notable that the patient, nine years before, had been under our care for an unusual injury to the right elbow, namely, a fracture of the coronoid process of the ulna with a detachment of a thin articular fragment of the condyles. Recovery from this had been complete, convalescence being delayed by marked interference with supination and pronation, and the tendency to formation of adhesions between the head of the radius and the external condyle which required to be frequently broken up by passive motions and massage.

Dr. Carleton P. Flint,[1] in 1908, reported a case of fracture of the capitellum and collected from the literature references to sixteen others, in fifteen of which the reports were accessible; these he carefully studied and analyzed, finding, as Hans Lorenz and Kocher had already pointed out, that there were two distinct classes of cases represented in this collection. The larger and more important group, ten in number, included cases reported by Hahn, Steinthal, Wright, Cotton, Stimson (three cases),

Stebbins, Flint, and Wilms. No data in the last-mentioned case were available. The second group included four cases reported by Kocher and two by Lorenz. In the first class there is a separation of the capitellum, in whole or in part, by a splitting fracture passing through the bone, while in the second the injury partakes of the nature of a partial or complete avulsion of the cartilage covering the capitellum, to which piece of cartilage, however, portions of the spongy tissue may adhere. It is to the first group, which has been called the *fractura capituli humeri totalis*, that our class belongs, and not to the second, or the *fractura capituli humeri partialis*—poor names, both of them, as Flint insists.

The second group may be briefly dismissed. Of very infrequent occurrence, they are, in the majority of cases, due to indirect violence, possibly by traction through the anterior capsular attachments pressing backward on the cartilage and prying it off, as when the injury occurs while lifting with the forearm extended (Kocher)—an explanation not accepted by Lorenz or Flint.

Chronic arthritis of a proliferating type seems to predispose to the accident. The symptoms are a snap in the joint and sharp pain at the time of occurrence, very little local reaction, and a limitation of extension due to the backward displacement of the detached cartilage, which can be palpated behind the external condyle, between it and the olecranon and head of the radius. There is temporary restoration of extension when this fragment is pushed forward into position. Flexion and pronation are not much interfered with, but supination may be limited, and valgus deformity is sometimes present; soft crepitus may be obtained. The *x*-ray shows irregularity of contour and weakening of the normal shadow of the capitellum (H. Lorenz).[2] The treatment is operative, and consists in removing the fragment through an appropriate incision, which was done in all the cases reported, with uniformly good results.

Of what might be termed true fractures, in which there is a detachment of the whole or a good-sized portion of this prominence, the number of cases which have been reported seems surprisingly

small. It is probable that many were overlooked in the past or were classed with fractures of the head of the radius, which they somewhat resemble. Flint quotes Kocher as expressing the opinion that the type he describes—that of cartilage avulsion—is not uncommon, as he observed four cases in three years. But, as there were no more reported for sixteen years until Lorenz added his two, Flint is inclined to disagree with Kocher. We have tried to add, by a search through the literature, other cases to those collected by Flint, excluding those fractures of the capitellum which were complicated by lesions of other portions of the lower end of the humerus, but not those associated with injuries of the radius and ulna.

We found reports of cases by L. A. Dunn,[3] Jonathan Hutchinson, Jr.,[4] Cates,[5] H. Reineking,[6] MacLean[7] (six cases), and Dr. Henry K. Pancoast, of the University of Pennsylvania, contributed three cases from his private records. These, with our own, make fourteen cases of capitellum fracture. MacLean's cases were gathered in an analysis of 176 cases of fracture of the lower end of the humerus in Perthe's Clinic in Leipzig, and, as they did not seem to be supported by radiograms or clinical notes, and details are lacking, they are of little value except as indicating to an uncertain extent the relative frequency of the injury. Details are also lacking in Pancoast's cases, but the records here are of much value as showing the frequency of occurrence of this fracture in comparison with fractures of the external condyle in general.

Dr. Pancoast kindly furnishes the following data. Out of seventy-nine cases of fracture of the external condyle of the humerus, complicated and uncomplicated, on his records, there were four cases, including our own, in which the articular portion of the external condyle was fractured and displaced. One of these four cases (some of them old injuries) was complicated by a fracture of the head of the radius. The remaining cases we have collected are here abstracted:

L. A. Dunn[3] showed, at a meeting of the Clinical Society of London, a boy of seven with a piece of loose bone in his elbow-joint. He had fallen and injured the elbow three years before.

The fragment appeared to be the capitellum, loosely attached to the head of the radius.

Jonathan Hutchinson, Jr.,[4] in a paper on the "Treatment of Injuries of the Lower End of the Humerus," mentioned a case in which he assisted Mr. Treves at an operation for fracture of the capitellum some months after the injury, "in which the capitellum was found to be completely turned around, so that its normal lower surface faced upward, and in which considerable improvement followed its removal." He mentions this as an example of the tendency of such fractures to result in the presence of a loose body in the joint producing an impairment of function, and also gives several other cases of fracture of the capitellum, all probably complicated ones, in which the fragment had become adherent to the head of the radius with or without the development of a pseudarthrosis between the end of the humerus and the separated fragment.

Cates[5] reports the case of a man who fell from a bridge, sustaining a fracture of several bones, including the ischium, the bones of the wrist, the head of the radius, and the coronoid process of the ulna. The capitellum was apparently fractured. The injuries resulted fatally.

H. Reineking[6] described this injury in a boy of nine who fell from a wagon, striking his left elbow. The early symptoms were pain excited by passive motion, limitation of movements of the joint to 45 degrees of flexion and 140 degrees of extension. There was no disturbance of pronation or supination, either active or passive. A slight swelling was present, more marked on the radial side of the joint, and tenderness over the external condyle near the articular surface. There was no palpable displacement of, or alteration in, the relation of the bony landmarks, and no crepitus. Later, ecchymosis appeared, and thickening under the upper portion of the supinator longus was noticed, with a persistence of limitation of motion as described above. The case was treated as a fracture of the external condyle. An *x*-ray, twenty-four days later, showed a complete separation of the capitellum, with displacement upon the anterior surface of the condyle,

the fractured surface facing the humerus and tilted at an angle of 90 degrees. Attempts at reduction under anesthesia, made a few days later, failed, and, operation being refused, splinting was continued. Six months later it was noted that all pain and tenderness were gone, motion, passive and active, was possible between 45 degrees and 165 degrees, or 120 degrees; the prominence in front of the external condyle and some "gunstock" deformity remained.

We are fortunate in being able to show some statistics which throw light on the relative frequency of capitellar fractures and those of the condyles in general. The statistics furnished us by H. K. Pancoast, of the *x*-ray Laboratory of the University Hospital, have been already quoted. Of seventy-nine cases of fracture of the external condyle of the humerus, complicated and uncomplicated, there were four, including our own, in which the articular portion of the external condyle was fractured and displaced.

J. E. Platt,[8] in an analysis of sixty fractures of the lower end of the humerus, had no pure case of capitellum fracture. In one case there were probably fractures of both capitellum and trochlea, complicated by backward dislocation of the head of the radius, and inward dislocation of the upper end of the ulna. No operation was done.

A. P. C. Ashhurst[9] had twelve fractures of the external condyle in fifty-six fractures and epiphyseal separations of the lower end of humerus, none of them of the capitellum.

MacLean,[7] in a study of the operative treatment of elbow fractures in Perthe's Clinic in Leipzig, analyzed 216 cases, of which 176 were of the lower end of the humerus; six of these were diagnosed as fractures of the capitellum, but no *x*-ray pictures or details are furnished, and the cases are of doubtful authenticity.

Counting these figures, and accepting MacLean's cases at their face value, it will be noted that in 371 fractures of the lower end of the humerus there are not more than ten of the capitellum alone, or 2.69 per cent., and, when we recall that Pancoast's list comprises only fractures of the external condyle, and that these would probably not include more than one-third of all his cases of fracture

of the lower end of the humerus, it would seem that isolated fracture of the capitellum would not occur in over 2 per cent. of injuries of the condyles, and probably not even to this extent. Cotton has seen but one case, and Stimson, with his unrivalled experience, reports but three.

The fact that exact diagnosis of the fracture is difficult without the *x*-ray picture explains the unfamiliarity of the older writers with the injury. Thus, Hamilton,[10] as late as 1884, quotes Stimson as giving but three examples of intracapsular fracture of the lower end of the humerus. Hamilton says the same difficulties present themselves here as in supposed examples of intracapsular fracture of the head of the humerus. He seems to think that when union has taken place it is conclusive evidence that the fracture was not entirely intracapsular, and states that in these three cases mentioned by Stimson there is no testimony to show that the line of fracture was entirely within the capsule, and says that, until we find a recent accident in which autopsy shall show such condition, the testimony is not conclusive. At present this kind of testimony, he says, is wanting.

Jonathan Hutchinson, Jr.,[4] in a discussion of injuries of the lower end of the humerus, also laid down the law that bony union was not to be looked for in cases of intra-articular fracture of the capitellum, and goes on to describe the case included in our series under his name as a confirmatory example of this law of non-union in intra-articular fractures. We know now that intra-articular fractures will unite when reduction is complete and fixation is absolute and prolonged, as repeatedly demonstrated even in the hip-joint.

John H. Poland,[11] in his work on "Traumatic Separation of the Epiphyses," quoted Sir Astley Cooper to the effect that if the epicondylo-capitellar fracture be entirely within the capsule it does not unite by bone, whereas, if the fracture be very oblique, and a considerable portion external to the capsular ligament, steady and long-continued support will cause it to unite.

Poland also states there was only one clinical case reported of epiphyseal separation of the capitellum, but this a doubtful one,

and the age given as seven years. If it did occur, he says the separation would be entirely within the capsule. As a reason for the infrequency of isolated fracture of the capitellum he advances the view that it is due to anatomical relations, the external epicondyle being so largely connected with the capitellar epiphysis. He refers to the cases of Hahn, Gurlt, Wright, Hutchinson, and Dunn. Flint studied the reports of nine cases. Of the fourteen cases which we have added, in only five are any details obtainable, and in three (Dunn, Hutchinson, Cates) the clinical history is of the scantiest, while in two—Reineking's and our own—the more complete history is available, and has already been detailed. For most of the following data, therefore, we are indebted to Flint's careful study of the subject, and, before him, to Hahn.

The accident is more common in males than females, and the ages range from seven to sixty-three, four being under the age at which the epiphysis of the capitellum becomes united. The common cause is direct violence to the elbow, especially when flexed. In none of the cases was there a predisposing pathological condition present in the joint. The usual symptoms are pain, swelling, ecchymosis, disability, and limitation of motion, and sometimes crepitus, the latter symptom not always to be elicited. The disability and local symptoms of fractures are less pronounced when, as occasionally happens, the displacement of the fragment is inconsiderable or in a backward direction, and correspondingly more pronounced and typical when, as usually happens, the broken portion turns forward and upward in front of the head of the radius to an angle of 90 degrees, where it forms a prominence in front of, and to the outer side of, the external condyle beneath the supinator longus muscle. Flexion is much inhibited, as by "a stone in a hinge," and extension also interfered with, but usually to a lesser degree.

Supination and pronation may be painful at first, but are not usually permanently affected, even if the condition goes unrecognized and uncorrected. Slight valgus deformity has been noted. If unreduced, a permanent thickening may increase the prominence of the displaced fragment, and aid in fixation of the same, or the

fragment may remain unattached and moveable with persistent joint crepitus and pain, and pronation and supination may suffer. In one or more instances, when complicated by fracture of the humerus and other injuries, the capitellum has become adherent to the end of the radius and a pseudarthrosis has formed between it and the end of the humerus (Hutchinson, Walther); and in Dunn's case, included in our list, a similar attachment to the head of the radius was supposed to be present.

The diagnosis of this injury is not always easy in the absence of a radiograph, and mistakes have been made and the condition overlooked. There are usually considerable pain, tenderness, and local reaction, as well as marked disability, and this is most pronounced in the movements of flexion and extension. Also, the preservation of the normal outlines of the condyles and olecranon posteriorly, and the presence of a hard body, perhaps movable, on the outer side of the flexor surface of the elbow (rarely behind the condyle), although this is not always palpable, serve to distinguish fracture of the capitellum from fractures of the external condyle and of the head and neck of the radius, or at least lead to a suspicion that a rarer injury is present.

Treatment.—This is operative. Those cases not operated on have yielded poor results, in that function has been permanently interfered with, and this mainly in the important movements of flexion and extension, while pronation and supination may be interfered with or may be normal. A valgus deformity will possibly be present, and pain, exaggerated by using the arm, may be expected for a long time. The attempt has been made to dress the arm in such a position that the fragment will fall back and be held in its normal position. Stebbins treated his patient with the arm in complete extension, in which position the fragment seemed to be reduced, but the final result could not be considered as functionally ideal.

In the cases studied by Flint, operation was performed in six of the nine cases of fracture of the type in which we are concerned, namely, the partial or complete fracture as distinguished from the cartilage avulsion type. In two cases partial or complete

resection of the joint was done, for indications more or less peremptory (compound injury—secondary inflammation). Of the remaining four, in three the fragment was removed, while in one of Stimson's cases it was found that the lower two-thirds of the capitellum had a posterior attachment (it was one of the unusual variety, where, as in cartilage avulsion, the fragment had been turned backward), and instead of removing it, Stimson turned it forward and sutured it in place by stitching the periosteum and secured a good result. Treves removed the fragment in the case reported by Hutchinson. So far as we know, none of the cases we have added to Flint's series were operated upon except Treves's and our own.

The fear of the fragment losing its vitality if not removed seems to have influenced surgeons to excise it. Our case is the only one besides Stimson's in which reduction appears to have been made, and in ours no retention sutures were used, flexion alone being depended upon to hold the fragment in its normal position. In Wright's case there did appear to be secondary infective changes in the joint at the time of operation, one month after the fracture occurred, and these may have been superimposed upon a devitalization of the detached fragment. The changes were such as to lead Wright to excise the joint. This is the only case in which suppuration occurred before operation. With our present attitude in surgery of the articulations it would seem wise to conserve the fragment with or without suture or nailing of the same as seems indicated, unless comminution or other complications be present.

Kocher's incision for excision of the elbow-joint is the one we employed, and is too well known to need description. Where the surgeon's object is, as in the procedure under discussion, merely to open the joint in order that he may replace or remove the fragment of the fractured eminentia capitata, the lower portion of the incision which curves backward over and divides transversely the lower fibres of the anconeus will probably be unnecessary. The exposure of the joint for any work on the external condyle or head of the radius is ideal, although Kocher himself states that here Cavazzini's transverse incision is occasionally of value (in diseased conditions).

For the Kocher-Lorenz type of injury, direct limited incision over the movable body has been practiced through the centre of Kocher's incision, which is preferable when possible, or by division of the anconeus fibres when the fragment takes a position behind the external condyle, as it frequently does in this variety (Lorenz). Here also the results of removal have been excellent.

References

1. Flint. Surg., Gyn. and Obstet., September, 1908.
2. Lorenz. Deutsch. Zeit. f. Chirurgie, 1905, vol. lxxviii, p. 531.
3. Dunn. Lancet, December 3, 1892, p. 1273.
4. Hutchinson, Jr. Brit. Med. Jour., November 3, 1894, p. 967.
5. Cates. Med. News, 1896, lxviii, p. 716.
6. Reineking. Surg., Gyn. and Obstet., December, 1909.
7. MacLean. V. Brun's Beit. z. klin. Chirurgie, 1912, lxxv, 3.
8. Platt. Contribution to the Surgery of Fractures and Dislocations of the Upper Extremity. London, 1899.
9. Ashhurst. An Anatomical and Surgical Study of the Fractures of the Lower End of the Humerus, 1910.
10. Hamilton. Treatise on Fractures and Dislocations, 7th ed., 1884.
11. Poland. Traumatic Separation of the Epiphyses.

DISCUSSION

Dr. Addinell Hewson: There is a point of great interest in the fracture of the capitellum of which Dr. Jopson has not spoken, and that is the relation of the supinator radii brevis muscle. This muscle, you will recall, arises from the outer condyle of the humerus and the orbicular ligament of the elbow and partly from the upper part of the lateral border of the ulna and from the surface beneath the lesser sigmoid cavity of that bone. Its fibres pass obliquely downward and forward (the ventro-manad) diverging as they go and are inserted in the dorsal lateral anterior surface of the radius, curving around that bone. It must be borne in mind, that the insertion of this muscle will extend as far as the middle of the shaft; it must also be borne in mind, that the muscle is a composite one, a portion of it being derived from the superficial extensor layer and the rest from the deep layer of the muscle of the forearm. From these relations, it is self-evident, that when the arm and forearm are placed in the Jones' position, the head of the radius being in the capitellar fossa, the fractured capitellum may be placed in its position and from the relaxed condition of the muscle, no tension is placed on the ligaments surrounding the bone involved, and consequently, the radius in this Jones' position, would hold tbe capitellum in place.

Dr. N. Ginsburg: Dr. Jopson's paper is very interesting to me and I have no doubt to Dr. Roberts because of a case we have just seen at the Polyclinic Hospital, in which the x-ray plate showed a picture which seems to correspond to that which Dr. Jopson has shown. We felt it might possibly be a case of epiphyseal separation because the child was only two (2) or three (3) years of age. We were unable to secure flexion of the elbow joint. Under ether anesthesia the arm was placed in acute flexion, much force being required to accomplish this. There was no history of injury. The case was originally brought to me for a cellulitis of the humeral region which was opened and drained. Our feeling at first was that the case was one of periarthritis, but the x-ray plate seems to show an injury similar to that which Dr. Jopson has described. The whole subject is exceedingly interesting and very instructive since Dr. Jopson has directed our attention to a type of elbow joint injury, the proper recognition of which might not always be readily understood.

CASES ILLUSTRATING MODERN BONE AND JOINT SURGERY[1]

By ASTLEY P. C. ASHHURST, M.D.

Even so short a time as twenty years ago bone and joint surgery consisted essentially in operations for necrosis, and excisions of joints for advanced tuberculous disease or to remedy disability due to ankylosis in bad position. Osteotomies were done for the deformities due to rachitis and for deformity at the hip-joint following healed coxalgia; and even in cases of marked disability from non-union of fractures operative fixation was undertaken, and in many cases with a great measure of success. An occasional bone cyst was opened and its interior scraped, but in most cases of tumors in bone amputation was done. Though modern methods have been gradually developed during this period it is only within the last five years that what may be described as modern bone and joint surgery has begun to exist. The old operations are still done, but there has been added a large number of new procedures of utmost importance. These have been made possible largely by the perfection of aseptic technique, and may be discussed under the headings of *Treatment of Fractures, Treatment of Ankylosis,* and *Bone Transplantation.*

Treatment of Fractures. The general employment of the *x*-ray to control the reduction of bone fragments, and the increased interest of accident insurance companies in the results of treatment, have brought the treatment of fractures once again into a

[1] Read October 7, 1914.

very important place in surgery. Indeed it is becoming almost a surgical specialty; and certainly it is true that most of the bad results are directly due to ignorance and carelessness in treatment. Patients with broken bones should be treated by surgeons whenever the latter are available. Though the general practitioner cannot always avoid having fracture cases under his care, he will do much better not to attempt to care for them if he can possibly avoid it; he has neither the training nor the facilities which are required to secure the best results.

It may be admitted that accurate anatomical reduction of a fracture in the shaft of a long bone is not always necessary to secure perfect functional recovery; yet it is very desirable to secure such reduction, especially in the lower extremity, where shortening or axial displacement is much less easily compensated for than in the arm or forearm; and if the fracture is near a joint it is imperative to secure anatomical replacement of the fragments at the risk of lasting disability if this is neglected. Fortunately it often is possible to secure reduction and to maintain it without resort to formal operation, as the following instance shows:

Fracture of Surgical Neck of Left Humerus Impacted in Bad Position; Reduction under Anesthetic.

Case 1.—Robert E., aged thirty-five years, was admitted to Dr. Frazier's service in the Episcopal Hospital, September 8, 1914. He had fallen thirty feet, and sustained, in addition to the injury mentioned above, fractures of the left radius and ulna above the wrist, and a fracture of the left femur below the trochanters. Here was a case of multiple fractures, in a young and healthy adult. Fig. 1 shows the position of the shoulder fragments on admission: the shaft was impacted into the head, but the position was very bad indeed, and reduction was imperative. The day after admission the patient was etherized, and the impaction at the shoulder was broken up by manipulation, the fractured ends reduced, and a suitable dressing applied. Fig. 2 is from a skiagraph made after reduction. This shows that the upper fragment is rotated slightly outward; to meet this indication the arm was dressed in abduction. The fractures of the forearm and the femur were also reduced while the patient was under the anesthetic, and very satisfactory positions secured. Convalescence was uneventful. Within two weeks time the fractures of the humerus and forearm had united, and union was progressing in the femur.

If sufficient reduction is not possible by manipulation even under an anesthetic, and with all the aids known to surgery, it is proper to resort to open operation.

Fig. 1.—Case I, impacted fracture of surgical neck of humerus.

Fracture of the Shaft of Left Femur, irreducible without Operation; Fixation by Plate.

Case 2.—Robert F., aged twenty-three years, first came under my care in Dr. Frazier's service at the Episcopal Hospital on August 1, 1911. Two weeks previously this patient was knocked down and run over by a wagon, sustaining a fracture of the left femur above its middle. On August 2, I had the patient etherized, and made attempts to reduce the fracture, in which there was overlapping of the fragments to the extent of one inch and a half (4 cm.). Although end-to-end apposition was not

secured (Fig. 3), the shortening was reduced to one-half an inch (1.25 cm.). This might have been considered sufficient reduction if the patient was old and feeble; but in a healthy young man, with his life before him, a better result evidently was demanded. Accordingly on August 7, the patient was again anesthetized, the fractured ends exposed, reduced, and fixed by plating (Fig. 4). The patient went home on crutches about two months later, and has had no further disability. There is no shortening, and free motion in the knee (75 to 180 degrees).

Fig. 2.—Case I, condition after reduction.

If fractures were properly treated from the first, subsequent operations for malunion or for non-union would be very rare. Unfortunately it is still very often necessary to undertake operative correction of such disabilities. In some cases of *malunion*

Fig. 3.—Case II, fracture of femur, irreducible without operation.

simple subcutaneous osteotomy will suffice to restore the axis of the bone; or excision of exuberant callus or of the projecting

Fig. 4.—Case II, fracture reduced and plated.

ends of the fragments may bring relief. In other cases formal resection of the fractured bone or bones must be undertaken, with fixation by plate or screw.

Unreduced Colles's Fracture of the Right Radius; Absolute disability, not relieved by subcutaneous osteotomy. Resection and plating.

Case 3.—Lena F., aged forty-nine years, sustained a Colles's fracture of the right radius in June, 1913. After two months of treatment she was etherized, and an attempt at reduction was made. This was not successful, marked "silver-fork" deformity and radial deviation of the hand persisting. In the autumn of 1913 this patient was referred to the orthopedic service of the Episcopal Hospital, and first came under my care. The hand was perfectly useless, and, what was even worse, was constantly painful, with referred pains up to the elbow and shoulder. For five months massage and passive movements were applied with little if any improvement. Therefore, in April, 1914, subcutaneous osteotomy of the radius was done, in the hope that restoration of the axis of the bone might restore some usefulness to her hand or at least relieve the neuritic pains. The patient felt so much better after the operation that a very few days after the splint was discontinued (four weeks after operation) she endeavored with this hand to support the head of her daughter during a convulsive attack. This gave her wrist a very severe wrench which incapacitated her for some weeks. The pains in the elbow and shoulder, however, ceased almost entirely after the osteotomy.

As considerable deformity remained, and the hand was still almost entirely useless four months after the first operation, it was determined to operate again. Fig. 5 shows the appearance of the bones at this time. There was marked radial deviation of the hand, the radius being considerably shorter than the ulna, while the carpal articulation was further disturbed by the dorsal displacement of the lower radial fragment, whose carpal surface faced toward the extensor rather than toward the flexor surface of the forearm. The healed osteotomy is visible above the fracture, with the deformity due to the unfortunate accident after the first operation.

On August 29, 1914, an open operation was done: the flexor tendons were loosened up from the fractured surfaces; the radius was divided, the fractured ends resected until proper alignment was secured; the head of the ulna was removed subperiosteally; and the radius fixed by a plate. The result is seen in Fig. 6. The normal contours of the articulating surfaces have been restored, the ulna now being no longer than the radius and the carpal surface of the radius facing forward (toward the flexor surface) instead of backward (toward the extensor surface) as formerly. Healing was delayed by some sloughing of the edge of the

skin flap, but within five weeks after operation the woman could appose her thumb easily to all the fingers, and had some power of grasping in the hand. Unfortunately neuritic pains persist, and long after-treatment will be requisite.[1]

Fig. 5.—Case III, unreduced Colles's fracture, before second operation.

Fig. 6.—Case III, condition after operation.

Malunion of Bi-malleolar Fracture at the Right Ankle; Absolute Disability. Resection and Screw Fixation.

Case 4.—Catharine R., aged forty years, sustained an inversion fracture of both malleoli at the right ankle in January, 1914. In June, 1914, she came to the orthopedic service of the Episcopal Hospital because she was still obliged to use crutches, pain preventing her from bearing any weight whatever on her foot. Fig. 7 shows the position of the bones at this time. It was evidently hopeless to look for improvement when none whatever had occurred in five months, and such marked deformity was present. Accordingly, on June 27, 1914, I exposed the fractures of both tibia and fibula, separated the fragments by chisel, along the lines of fracture, reduced the deformity, and fixed the bones in proper position with screws. No retentive dressing was required, owing to the security of the screw fixation. This enabled light passive motion to be instituted

[1] The plate was removed January 20, 1915, and in February the patient commenced to have fair use of the hand, with little pain.

the day after operation, and within ten days, when the wounds had healed, no pain or disability remained. The patient was forbidden to bear any weight on her foot for more than two months. At the end of this time, on making the first attempt to walk, she threw away her crutches and walked painlessly, though with a slight limp from stiffness. Last week, she tells me, she visited Mauch Chunk, and after a ride on the "Switchback" walked all the way down the side of the mountain without difficulty. Fig. 8 shows the position of the bones after operation.

Fig. 7.—Case IV, malleolar fracture of ankle, before operation.

Fig. 8.—Case IV, after operation.

In the case of both the patients whose histories have just been reported (Cases 3 and 4), the proper time for operation was soon after the injury, when it was found impossible to secure reduction of the fragments. In both cases many months of discomfort would have been saved, and the ultimate result would almost certainly have been better than with delayed operation.

Nonunion of a fractured bone presents even a more difficult

problem than malunion. Resection and fixation by plates or screws do not always succeed in arousing sufficient osteogenesis to secure firm union. In many cases it is better to bridge the gap by a bone transplant, taken from the same bone or elsewhere in the patient's body. I have reported before the Philadelphia Academy of Surgery (*Annals of Surgery*, 1914, ii, 779) the very satisfactory result obtained by bone transplantation in a case of ununited fracture of the neck of the femur, and give below the notes of another case of nonunion in which transplantation of bone was employed.

Ununited Fracture of Radius and Ulna; Fixation by Bone Transplant and Steel Plate.

Case 5.—Fred. H., aged thirty-five years, on May 27, 1913, was caught in shafting and swung around the machinery in his mill until the power

Fig. 9.—Case V, one year after injury.

Fig. 10.—Case V, after plating and transplanting.

could be shut off. He was admitted at once to the Episcopal Hospital. He sustained a compound fracture of both bones of the right forearm, all four bone ends projecting through the soft parts; as well as a compound

double fracture of the humerus of the same arm, one of the fragments here also projecting through the skin. I cleansed the wounds thoroughly, repaired the damage to the soft parts and reduced the fractures as far as possible. The humerus healed by firm bony union without appreciable deformity; but though healing of the soft parts in the forearm occurred as soon as could be expected, the bones failed to unite. They maintained fair position, but the ulna, part of which had to be excised at the time of the accident, remained entirely ununited; while only fibrous union was secured in the radius (Fig. 9). Operation to remedy this non-union was done September 9, 1914 (sixteen months after the original injury): the radius was resected until healthy marrow was exposed, and then plated; while the ulnar fragments, the gap between whose ends could not be bridged without sacrificing an undue length of the radius, were united by a transplant cut from the ulna higher up. Fig. 10 is from a skiagraph made a few days after operation. Though bony union has not taken place in either radius or ulna at the end of six months, firm fibrous union has been secured, and the usefulness and stability of the arm are markedly increased.

Treatment of Ankylosis. Ankylosis was formerly treated by excision of the joint affected. The classical excision of a joint such as the elbow or shoulder, was designed to secure a movable joint; in the knee, on the other hand, excision was adopted only when the joint was ankylosed in bad position, and aimed to secure a stiff joint in good position. The modern operation of *arthroplasty* (by interposition of fat and fascia flaps) enables the patient to secure not only much greater stability at the elbow and shoulder than was secured by excision, but even at the knee and hip a fair degree of motion may be secured without impairing the stability of these joints. This is of especial value at the knee, as a stiff hip is more readily compensated for; but the operation is difficult, and not always successful. Probably if a surgeon obtains 50 per cent. of successful results in his arthroplasties at the knee he will be doing well. Even if a full range of motion is not secured, the patient usually is satisfied to obtain enough motion to promote walking and to enable him to be seated comfortably. I select the following case for report here, because the operation of arthroplasty was done at both knee and elbow in the same patient.

Ankylosis of Elbow and Knee; Arthroplasty.

Case 6.—Gertrude T., aged twenty-three years, applied to Dr. Harte's service at the Orthopædic Hospital on March 2, 1913, for ankylosis of the left elbow and the right knee. In May, 1912, when about seven months pregnant, but without any evident cause (such as preceding tonsillitis, influenza, etc.), this patient had felt pain and stiffness around her right hip during one entire day. That night she was awakened by pain in the left elbow, and next morning she found it swollen. The second night the right knee became painful and swollen. She was not confined to bed until the fourth day, and was sent to the Philadelphia Hospital on the sixth day of illness. She remained in bed in the hospital for seven weeks, with fever, and acute arthritis. The pregnancy was terminated normally after convalescence.

When first seen at the Orthopædic Hospital, ten months after the onset of the arthritis, this young woman was unable to walk without crutches. There was about ten degrees of motion in the knee (130 to 140 degrees), which was not painful. The patella was ankylosed to the condyles of the femur, but the femur and tibia were not united by bony ankylosis. At operation, however, it was found impossible to secure more than 10 degrees of motion in the knee even after the patella had been loosened from the condyles until the condyles themselve were resected; evidently the arthritis had distorted the articular surfaces so greatly as to prevent motion even though no bony ankylosis between tibia and femur was present.

The elbow was fixed in bony ankylosis at an angle of 110 degrees; fortunately the radio-humeral and the upper radio-ulnar joints were not involved, as rotation in the forearm was normal.

Arthroplasty of the elbow was done May 1, 1913, and of the knee three weeks later. Convalescence was uneventful. Free motion was secured in the elbow (50 to 160 degrees), and fair motion in the knee (120 to 175 degrees) by the time she was discharged from the hospital, three months after the last operation. At this time she was able to walk without crutches. Fig. 11 shows the condition on admission; Figs. 12 and 13 show respectively the amount of flexion and of extension present on discharge.

The patient was seen again one year after operation, when she returned to the hospital for a sprain of the knee which had been operated on, due to a recent fall. Until this injury she had been able to walk about well without any support, going up and down stairs constantly and doing her own housework and caring for her children. There was at this time free motion in the elbow (45 to 150 degrees), and in the recently sprained knee there was motion from 95 to 150 degrees. As there was still some effusion in the knee from the recent injury, and motion was painful, it is probable that the full range of motion was not secured at this examination.

FIG. 11.—Case VI, condition on admission.

FIG. 12.—Case VI, limits of flexion three months after operation.

FIG. 13.—Case VI, limits of extension three months after operation.

Examination October 17, 1914, showed free motion in the elbow, from 45 to 150 degrees; there was active power of extension in the triceps, and the joint was quite stable. In the knee there was motion from 100 to 167 degrees, but although the patient could stand momentarily on this leg without other suppert, the power in the quadriceps was not sufficient to maintain the knee in extension if the limb was held up horizontally. In the house she walks without support, but uses a cane on the street. She cannot go up stairs "leg over leg." She claims that the knee is still gaining in strength, and that it is now much more useful than six months ago.

Bone Transplantation. One of the chief indications for this operation, as already mentioned, is nonunion after fracture. It is even more frequently employed to secure fixation of the spine in cases of tuberculosis of the vertebræ; and after excision of bone tumors the insert of a transplant may be the only satisfactory way to maintain the form of the limb.

Fig. 14.—Case VII, tuberculosis of spine on admission.

Fig. 15.—Case VII, result of bone transplantation.

Tuberculosis of Vertebræ; Fixation by a Bone Transplant.

Case 7.—Emma C., aged four years, was admitted to my service at the Episcopal Hospital, May 18, 1914, with tuberculosis of the spine of several months' duration, hitherto untreated (Fig. 14). After one month's

recumbency on a Bradford frame the deformity had markedly decreased, and on June 27, 1914, a transplant was cut from the patient's tibia and inserted in the split spinous processes of the 11th and 12th thoracic and the 1st, 2nd, 3rd, 4th, and 5th lumbar vertebræ. This almost completely reduced the kyphos. Seven weeks later, however, it was found that the lower end of the transplant projected unduly beneath the skin, and a skiagraph showed that it had sprung loose from the 4th and 5th lumbar vertebræ. Accordingly, on August 15, 1914, after nicking the transplant with a saw, a green-stick fracture was produced in it just below the spine of the 3rd lumbar vertebra, and the end of the transplant was bent inward and embedded again in the spinous processes of the 4th and 5th lumbar vertebræ. Six weeks after the last operation the deformity was inconspicuous and the child's health perfect (Fig. 15).

The object in fixing the spine by a bone transplant of course is to cure the disease by immobilizing the spine more thoroughly than can be accomplished in any other way. Incidentally this method prevents recurrence of deformity, or at least prevents increase of deformity if that which has already developed cannot be overcome by recumbency before operation. It is my practice to put these patients to bed until the deformity has nearly or quite disappeared, and until they learn to lie reasonably quiet; then to operate, and to keep them in bed about six weeks after operation. They are then allowed to be about with a light brace, which is worn for about six months. Many patients, however, discard the brace contrary to advice very soon after operation. But though I have never seen any evil consequences, I believe it is safer to wear a support for the time indicated. The operation in itself appears to be devoid of serious risk. I say this notwithstanding the fact that the first patient on whom I employed it died of pneumonia, and that another patient died of tuberculous meningitis about seven weeks after operation. A patient *may* die of pneumonia after any operation; and many a patient with tuberculosis of bone who has had no operation develops tuberculous meningitis while lying quietly in bed. So that these fatal issues are not, I believe, to be charged to the operation itself. It is noticeable that even very soon after the operation the patients improve in health and seem to feel much stronger.

Myeloma of Radius; Excision and Transplantation of Bone.

Case 8.—Sophy M., aged twenty-two years, applied to Dr. Harte's service at the Orthopædic Hospital, February 20, 1913, with a cystic swelling of the wrist, which at first sight was mistaken for tuberculosis of the tendon sheaths. The history was that the swelling had gradually

Fig. 16.—Case VIII, destruction of lower end of radius by "giant-celled sarcoma."

developed during the preceding year (since February, 1912) from no well ascertained cause. A skiagraph (Fig. 16) showed the lower end of the radius destroyed by a cyst, which, however, left the wrist joint and the overlying soft parts intact. On March 5, 1913, Dr. Harte opened and curetted the cyst, whose walls were very thin, there being scarcely any

trace of bony tissue discernible.[1] A transplant was cut from the tibia and inserted in the interior of the cyst to maintain the form of the bone and in the hope of stimulating osteogenesis. For months the local condition continued to improve. The tumor became smaller and its walls firmer; it lost its cystic feel, but the forearm remained abnormally large,

Fig. 17.—Case VIII, result of bone transplantation.

and caused the patient considerable annoyance. A skiagraph made September 24, 1913 (six months after operation) showed that the transplant was being absorbed. Early in 1914 the tumor again began to soften, the local heat and discomfort increased, until finally in June, 1914, the girl consented to another operation. She was referred to my

[1] Dr. Paul A. Lewis, of the Pennsylvania Hospital, reported that the growth was a "giant-celled sarcoma."

service at the Episcopal Hospital. On June 27, 1914, I excised the entire lower end of the radius, including its periosteum and articular surface.[1] It was found that the extensor tendons of the thumb passed

Fig. 18.—Case VIII, three months after operation.

through a canal in the tumor, and while one of the tendons could be pulled out of this canal after being divided, the other could not be extracted and a couple of inches of it had to be removed with the tumor.

Fig. 19.—Case VIII, three months after operation.

Moreover, the tumor so overhung the carpal bones, although it had not broken through the articular surface of the radius, that it was impossible during the operation to outline its limits precisely, and the scaphoid and

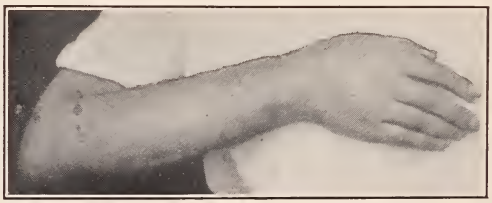

Fig. 20.—Case VIII, three months after operation.

semilunar bones were inadvertently removed along with the tumor. A transplant was then cut from the tibia (5 inches long, and of the thick-

[1] Dr. C. Y. White, Director of the Pathological Laboratories of the Episcopal Hospital, reported that the growth was a "giant-celled sarcoma."

ness and shape of the lower end of the radius) and inserted in the large wound caused by removal of the tumor. This transplant was fixed to the shaft of the radius by a steel plate; the plate was screwed to the radius, but as the screws fixing it to the transplant twisted loose when half inserted, it was necessary to fix the plate to the transplant by a wire loop (Fig. 17). Healing was uneventful. A splint was worn for three months after the operation. At present the transplant is firmly united to the shaft of the radius; there is rotation in the forearm through an arc of more than 90 degrees; there is flexion in the wrist to 140 degrees, and extension to a straight line (180 degrees). The girl can make a good fist, and has fair power of grasping which is rapidly improving. Figs. 18, 19, and 20 are from photographs made three months after operation.

Many other examples could be cited, exemplifying the value of modern surgical procedures in different lesions of the bones and joints. Nothing has been said of the treatment of dislocations, otherwise irreducible, by arthrotomy, reefing of the capsule, etc.; of the treatment of osteomyelitis by excision of the diaphysis, which gives admirable results in selected cases; nor of the treatment of paralytic flail-joints by production of ankylosis (arthrodesis), which is an operation of the utmost value. The cases herein reported serve merely as samples of the kind of work that is now being done, and I trust they may stimulate the interest of the profession in a class of patients too often neglected, or in whom the most favorable time for operative correction of the disability is allowed to pass before the surgeon is consulted.

DISCUSSION

Dr. John B. Roberts: The growth of bone surgery, in regard to fractures, the reconstruction of ankylosed joints and the transplantation of bone has been so exceedingly satisfactory in the last few years that it is almost like a revelation. Medical men must agree that many fractures ought to be treated only by surgeons, because surgeons alone are the medical men who have the experience, judgment, and technique to operate upon such cases in a modern aseptic operative way. I am of the opinion that many fractures are operated upon by plates, screws,

and wires that would not need to be, if a surgeon saw them early; and if after he did see them, he used the care and scientific skill of the gentleman who has reported these cases tonight. I am convinced that Lucas-Championnière was correct long ago when he said that fractures should be treated by the early application of moderate massage, not the massage of the ordinary masseur, but light stroking to relieve spasm and pain, followed by early passive and active mobilization with a moderate amount of support, in some cases with splints, but with the early rejection of splints. Lucas-Championnière showed us the value of this treatment; but most medical men have not followed it, because he perhaps was somewhat extreme in his views.

Lane, who has done so much for surgery and who advocates operation generally in fractures, has been driven to an extreme in operative work with plates, in my opinion, because his colleagues in his own country, and perhaps, in others, have adhered too much to prolonged immobilization of fractures, and as a result have neglected the care of the soft tissues, and have had bad anatomical and bad functional results.

In my own work I have, as have many American surgeons, adopted in part, early massage with passive and active mobilization of the French authority, and have resorted to open fixation advocated by the English surgeon already mentioned only in selected cases. There are two extremes and one must pick his cases as Dr. Ashhurst has so admirably shown us tonight. The surgeon should select those upon which he must operate promptly and those which should not be operated upon at all. These are rather easily differentiated. There are border-line cases, however, in which some men will operate, and others will treat by non-operative means. Many of these will do as well by one method as by the other, if handled by competent surgeons and the after treatment be not relinquished to inexperienced subordinates. There is a large number of fractures which must of necessity be seen by the general practitioner, and which cannot be put into the hands of the men who have a large surgical experience, the benefit of x-ray examination and the conveniences of a large hospital. It is fortunate that many of these can be and should be treated by non-operative measures. Others should, whenever possible, be placed under the care of surgical specialists, because only in such hands are the functional and anatomical results likely to be satisfactory; and the risks of operative sepsis usually avoided.

Dr. G. G. Davis: I think Dr. Ashhurst has chosen well to characterize his work as a contrast of work of the present with that of the past. It used to be that the bulk of cases in our surgical wards was made up of amputations, hernias, a certain amount of cancer and fracture cases. Then came a period of expansion which was facilitated by the

antiseptic method and visceral surgery came to the fore. The surgeon began attacking all the viscera in the body and we had crowded into our general surgical wards appendix cases and all kinds of pelvic surgery. Not satisfied with that, there was included, work upon the rectum, intestinal canal, the region of the kidney, gall-bladder, brain, and nerves until there was no room in our wards for bone surgery. Not only that, but the attention of the surgeon was so concentrated upon the more novel, more brilliant, more radical, and to a certain extent more satisfactory, visceral surgery, that not a few general surgeons deliberately ignored bone surgery, with the result that we had a decline in the conservative treatment of fractures. Then the Roentgen ray showed us what we could see if we looked properly into fractures. The general surgeon again came to the rescue, and I might say that almost all recent fractures were operated. While all this was going on, bone and joint surgery was developing. One of the recent results was given by Macewen, and there are others working in the same lines. You will observe that the bulk of the cases which Dr. Ashhurst has shown us tonight are cases which had been treated in the general surgical ward but required subsequent treatment. In other words, after discharge from the general surgical wards, there is still a tremendous amount of repair work to be done. I am glad to see that there is one rising man who recognizes and takes advantage of the opportunity presented. The demand for beds in our hospitals is so great that there is but little facility in this city for the treatment of chronic bone and joint defects. The bulk of the medical profession does not give these patients the attention they should, and there is a great field for surgeons who possess the skill required. The surgeon, however, who wishes to do this class of work must educate himself to its proper performance. In the cases shown by Dr. Ashhurst, before saying what should be done in an operative way, the surgeon must know what should be done in a non-operative way. He must be able to recognize bone and joint troubles. Until then he is not qualified to undertake the operative treatment. I need not point out that the field is one of the most highly attractive because of its great possibilities and the opportunity for the skill and ingenuity of the surgeon.

When it comes to the various classes of arthroplasty, in our general hospitals it is easy enough for anyone with a recent fracture to get into our general hospitals within twenty-four hours. They are kept in bed until union has taken place, which is from six to ten weeks. When such patients have occupied beds in the general surgical ward for that length of time they become restless and go home, but they are practically disabled when dismissed. Oftentimes they become useful citizens, but not infrequently they degenerate and become charges upon the community.

There is a great field, not only in an operative way, but in a non-operative way in joint cases. Anyone who has done a large number of resections of the elbow and tried arthroplasty will have no difficulty in deciding by which method he will secure the better result. The transplantation of bone has also demonstrated its value. My experience has been mostly with tuberculous cases and with cases of spine trouble. Personally, I have lost one such case and an assistant has lost one, both of which were cases in which there was a relighting up of old tuberculous processes. In both cases the wounds had been practically healed. A very small number will have a return of the tuberculous condition and the surgeon will have the misfortune to have a case do badly and die from relighting of the tuberculous process. There is some risk attached to all such cases, and I do not see how it can be avoided. I am glad that Dr. Ashhurst has been able to report such an array of cases. He has not exhausted the field, and with more workers, we shall have fewer cripples in the community.

THE PATHOLOGY OF TABETIC OCULAR PALSY, WITH REMARKS ON THE RELATION OF SYPHILIS TO THE SO-CALLED PARASYPHILITIC DISEASES[1]

By WILLIAM G. SPILLER, M.D.

The long struggle, led especially by Fournier and Erb, to establish a relationship between syphilis and the diseases known under the term of parasyphilis has been crowned with success, but since the finding of the Spirochæta pallida in paresis and tabes by Noguchi and Moore, and the confirmation of these findings by other investigators, the parasyphilitic diseases have become the subject of an important discussion. Our present knowledge of syphilis of the nervous system has been presented clearly in the recent papers by Nonne at the meetings of the International Medical Congress and the Deutsche Naturforscher und Aerzte. We recognize tabes, paresis, tabo-paresis, primary optic atrophy and cerebrospinal syphilis as caused by the Spirochæta pallida, and these disorders are distinct clinical forms but many clinical and pathological cases make us consider whether the sharp distinctions are invariably to be maintained, whether tabes and paresis are truly parasyphilitic diseases or are more closely syphilitic affections. I have frequently had difficulty in deciding whether a certain clinical case should be regarded as one of tabes or spinal syphilis, and while paresis and cerebral syphilis are comparatively sharp clinical forms, there are cases where one may hesitate to decide whether the diagnosis should be paresis or cerebral syphilis, and cases even have been described in which cerebral syphilis was supposed to be associated in the same person

[1] Read November 4, 1914.

with paresis. There is reason to believe that special strains of the Spirochæta pallida may exist, as shown by Henry J. Nichols,[1] and may cause different syphilitic diseases of the nervous system.

The paper by Nonne[2] on the present status of the syphilis tabes paresis question is so important, and apparently so unknown to some, that it seems well to give a brief abstract of it.

Erb gradually became convinced of the true syphilitic nature of the so-called parasyphilitic diseases, and doubted because of many clinical facts whether one could speak of metasyphilitic, parasyphilitic, or postsyphilitic diseases. Hirschl regarded paresis as nothing more than a late effect of syphilis, as a syphilitic encephalitis with termination in syphilitic cerebral atrophy. Raymond took the same stand in the discussion held in Paris over paresis, and Leredde before 1908 declared that tabes and paresis are anatomical and clinical forms of nervous syphilis, the results of a slowly developing syphilitic process. Many transitional forms occur between paresis and tabes on one side and the "true" syphilitic diseases on the other. The examinations of the cerebrospinal fluid have given the same results for tabes and paresis as for nervous syphilis, except that there are quantitative but not qualitative differences. Jakob and Kafka have shown that paresis may be very typical in its clinical serologic appearances, and that what appears to be typical paresis is shown not to be paresis by the microscope. This has been demonstrated also by Schoenhals, and Nissl emphasizes this fact. Everyone knows, says Nonne, of cases in which the clinical picture at first was that of arterial or meningeal cerebral syphilis but later was typically that of paresis. He has seen such cases almost every year. As for a difference regarding the time interval there are many cases in the literature in which paresis and tabes have appeared within two or three years after the infection. Nonne has seen tabes begin one and a half years after the infection.

As for the effect of treatment, everyone knows that antisyphilitic treatment fails in the arteritic or endarteritic form of syphilis

[1] Journal of Experimental Medicine, April 1, 1914, p. 362.
[2] Deutsche Zeitschrift für Nervenheilkunde, vol. xlix, p. 384.

of the brain and cord. Erb and Nonne declare that antisyphilitic treatment is of service in tabes, and others assert the same for paresis.

Nonne says it is certain that the characteristics of paresis as described by Nissl and Alzheimer exist, but Nissl himself acknowledges that all the lesions of paresis found in the cells, vessels, and neuroglia, and the appearance of plasma cells occur with other processes, and the only essential histological features of paresis are the extent and intensity of the vascular changes, the great extent of the alteration of cells, the intense loss of fibers, the situation of the neurogliar proliferation, the disturbance of the cell arrangement, the preference of plasma cells and lymphocytes for the sheaths of the vessels, and the greater implication of the frontal lobes. Obersteiner, however, has shown that paresis affects the whole brain, the white matter as well as the gray, the cerebellum and spinal cord, and Nonne says all the findings of paresis in their individuality present no differences from those of other syphilitic diseases. Binswanger long ago described the combination of paresis and true syphilis of the brain, and this combination has been shown by Alzheimer, Sträussler and A. Jakobs, and such cases are becoming common.

Tabes formerly was believed to be a primary degeneration of the nervous system. Dejerine and later Dinkler described meningitis occurring with tabes, but this was supposed to be merely a combination of lesions. Schröder in 1906, and E. Meyer and Gustav Oppenheim in 1908, showed that collections of lymphocytes and plasma cells in the perivascular lymph sheaths occur in tabes as in paresis in the pia and the vessels in the pial septa, and even within the posterior and lateral columns of the cord, therefore says Nonne we must reconsider whether tabes is primarily a disease of the parenchyma of the spinal cord.

The most characteristic lesion of cerebrospinal syphilis, in my experience, is round-cell infiltration, lymphocytic infiltration, of the pia. It is often associated with perivascular round-cell infiltration within the brain and cord substance. It is not pathognomonic and may occur with some other conditions, but I believe

there is no acute manifestation of syphilis of the cerebrospinal axis without it. Changes in the walls of the bloodvessels, thickening of the intima, often are present, but the lymphocytic infiltration may be the only lesion. I have a brain in my possession that shows a moderate but distinct lymphocytic infiltration of the pia and no pronounced change in the vessels. It was from a patient who had been under the care of Dr. James Tyson and Dr. William F. Norris and had had clinical signs of syphilis thirty-one years, and had received much antisyphilitic treatment. I have other specimens justifying the statement that the lymphocytic infiltration may be the only lesion of syphilis.

It is questionable whether these lymphocytic cells act mechanically by pressure; where they are in large masses they probably exert pressure on nerve fibres passing through the masses. The lymphocytic infiltration has appeared to me as an index of the intensity of the pathological condition, as a reaction to a toxic condition of the cerebrospinal fluid, and it is this toxicity which produces degeneration of nerve fibers and the lymphocytic infiltration; therefore the lymphocytic infiltration always has a pathological value.

We see clinical cases of so-called monosymptomatic tabes, or cases in which two or three signs of tabes are present. Some times microscopical examination shows a pronounced, but not necessarily intense, lymphocytic infiltration of the pia and slight degeneration of the posterior columns as in tabes. Is this incipient tabes? Why not equally well incipient syphilis? The lesions of syphilis may not develop beyond a lymphocytic infiltration of the pia in thirty-one years, as shown by the case referred to above, and if some degeneration of the posterior roots occurs in such a case the process is not essentially different.

Difference of opinion exists as to the nuclear or nerve origin of tabetic ocular palsies and a distinction is made by some in the pathology of the ocular palsies of tabes and brain syphilis. It would seem from the study of the following case of complete bilateral tabetic ophthalmoplegia that this distinction is unreliable and that in this as well as in other respects the sharp limitation

formerly made of parasyphilis and cerebrospinal syphilis needs much modification.

J. F., laboratory No. 631, was admitted to my service at the Philadelphia General Hospital Jan. 29, 1913, and died Feb. 19, 1913. He had a chancre in 1895. The right knee became much swollen in the winter of 1908 and the swelling was without spontaneous pain or pain on motion. About 1911 the right eye closed and within a few months the left eye closed so that to see he was obliged to raise either upper lid with his fingers. He had sharp shooting pains in the lower limbs before the arthropathy of the right knee developed, and his lower limbs felt as though they were pricked with pins. He complained of girdle sensation and said he felt as though a strap were tightened about the lower ribs and waist. In walking on the street he would stub his toes thinking he had raised his toes high enough to clear the ground. He evidently had at this time impairment of the sense of position. His urine dribbled occasionally and at times urination was accomplished by much straining.

When he came into the hospital the right knee was greatly swollen and crepitation was obtained upon pressure. The right leg could be rotated outwardly and inwardly to an abnormal degree. The left lower limb also presented much hypotonia. The lower limbs were much atrophied. The tendon reflexes of the upper limbs were diminished. The patellar and Achilles tendon reflexes were lost. The finger to nose test showed ataxia. Dr. Hansell examined the eyes Feb. 2, 1913, and reported that there was total internal and external ophthalmoplegia of both eyes, with paralytic divergence. The iridic reaction was lost. The optic nerves were partially degenerated.

At the necropsy performed by Dr. G. McConnell, the enlarged right knee-joint was somewhat fluctuating and hard, irregular masses could be felt within it. The upper portion of the tibia was enlarged and roughened and the knee-joint was so damaged that the leg could be moved in all directions. When this joint was opened about 500 c.c. of thick brownish fluid escaped, leaving a sac lined with a thick membrane from which hung numerous irregular calcified masses. The lower end of the femur was thickened and very irregular, but appeared to be covered by the periosteum.

The region of the ocular nerves in the brain stem was cut in microscopical serial sections and one of every ten sections was stained by the Weigert hematoxylin method. A similar series was made with nuclear stains, and Nissl sections also were made.

Much lymphocytic infiltration was found in the pia of the spinal cord and base of the brain and the basilar artery presented much endarteritis.

The posterior lumbar roots and the posterior columns of the cord were degenerated in the usual manner of tabes.

The ocular nerves were cut separately from the brain. Each oculomotor nerve showed much lymphocytic infiltration and this infiltration was more intense in the left nerve. These nerves were much and equally degenerated, and the degeneration was greater than that of the abducent and trochlear nerves. The oculomotor nuclei were greatly atrophied and contained few nerve cells, and the oculomotor fibers within the cerebral peduncles were much fewer than normal. Patches of rarefied tissue containing few nerve fibers were found within the oculomotor nuclei. The Edinger-Westphal nuclei were much better preserved than the other portions of the oculomotor nuclei.

The trochlear nerves showed slight lymphocytic infiltration.

The left abducent nucleus was considerably more atrophied than the right although the right nucleus was much affected. The abducent nerves were much atrophied, the left more so than the right. Both these nerves presented considerable lymphocytic infiltration, and the left more than the right.

The degeneration of the oculomotor nerves was so far advanced that it was impossible to decide whether the degeneration began in the nerve or in the nucleus, but the findings in the abducent nerves were of importance in this respect. The left nucleus and nerve were considerably more degenerated than the right, and the lymphocytic infiltration of the left nerve at its exit from the upper medulla oblongata was greater than that of the right. This would seem to indicate that the syphilitic process was primarily in the nerve rather than the nucleus, and would make a distinction between the ocular palsies of tabes and syphilis unreliable. This case clinically was distinctly one of tabes, and the pathological findings in the cord were those of tabes.

Among writers who have given attention to the pathology of ocular palsies in tabes and syphilis the view has been largely held that tabetic palsies are usually of nuclear origin while those of brain syphilis are usually from nerve degeneration. Thus Uhthoff gives a long list of authors as references for his statement that tabetic ocular palsies are often nuclear in origin, but he states that many of these authors speak of degeneration of root fibers of these ocular nerves and of the nerves themselves in addition to the nuclear lesions as almost constant findings. Cases of tabetic ocular palsy in which only the nuclei of these nerves are

degenerated are very rare, chiefly because the examination is made long after the onset of the palsy when the nerve lesions must follow the nuclear. In some cases the cells are reported as more degenerated than the nerve fibers of the ocular nerves, and on this account the nuclear degeneration is supposed to be primary. In other cases the nerve lesions are more intense than the nuclear. Nevertheless Uhthoff asserts that a considerable number of cases show the degeneration to be primarily nuclear either by absence of peripheral change or greater degeneration of the nuclei, and he believes these cases are the more numerous. Ependymal proliferation of the aqueduct of Sylvius and the fourth ventricle appears to be relatively seldom the cause of tabetic ocular palsy. Hemorrhages in the ocular nuclei are seldom observed and in part at least occur shortly before death.

Uhthoff[1] states that pronounced external or total ophthalmoplegia has occurred only in about 2 per cent. of his tabes cases, but he found about 40 cases with necropsy in the literature.

Uhthoff in contrast to his views regarding the greater frequency of nuclear lesions as the cause of tabetic ocular palsy, states that he believes single or double oculomotor palsy in syphilis, even when other symptoms fail, very rarely is of nuclear origin and almost always is basal.

He refers to a case reported by v. Monakow of total ophthalmoplegia in which the oculomotor nuclei were degenerated and the abducens and trochlearis nuclei were almost normal. He believed that the ophthalmoplegia in part was caused by the implication of fibers from the cerebral cortex to the nuclei.

Nonne[2] makes a distinction between the ocular palsies of tabes and syphilis. The disappearance of ocular palsy is not characteristic of syphilis, he says, as this very often occurs in postsyphilitic tabes.

He refers to some cases in which the lesions were at the sphenoidal fissure, in these cases the symptoms were amaurosis, paralysis of all external and internal ocular muscles, anesthesia

[1] Graefe-Saemisch Handbuch der gesamten Augenheilkunde, vol. xi, part 2A.
[2] Syphilis und Nervensystem. Second edition.

of the first branch of the trigeminus, pain in the depth of the orbit, edema of the upper lid and slight exophthalmos.

He states that although one might expect to find isolated nuclear disease in syphilitic ocular palsy, as individual branches of the oculomotorius are often paralyzed, no necropsy has shown this. Wilbrand and Saenger, he says, make the same statement.

Wilbrand and Saenger[1] state that in the majority of cases of tabetic ophthalmoplegia intense atrophy of the nuclei of the ocular nerves was found as well as of the nerve roots, nerves and muscles. They speak of the lesion as primarily nuclear (p. 153).

In speaking of Hutchinson's case of ophthalmoplegia examined microscopically by Gowers, these authors say syphilis as the cause of primary nuclear degeneration in this case is doubtful and the case must be regarded as one of tabes. Oppenheim's case, they state, is the only one they know of in which primary nuclear atrophy occurred during the period of constitutional syphilis (p. 333).

They thus sharply define tabetic ophthalmoplegia as primarily nuclear in the majority of cases, and syphilitic ophthalmoplegia as primarily basal.

The question arises as to the influence of the ocular centres upon one another. That some sort of connection must exist is shown by the paralysis of lateral associated movement with preservation of the function of the internal rectus in convergence. Leonard J. Kidd[2] has recently discussed the method of connection of these ocular muscles. He shows that the widely accepted teaching that lateral conjugate eye-movements are carried out by virtue of fibers, which the sixth nucleus is alleged to send to the contra-lateral third nucleus or root for the innervation of the internal rectus muscle, has been demonstrated to be erroneous by the sure test of carefully planned and executed experimentation. He calls this sixth nucleus hypothesis the Duval-Laborde hypothesis.

Van der Schueren has established that in the rabbit the posterior

[1] Die Neurolgie des Auges, vol. i.
[2] Review of Neurology and Psychiatry, Oct., 1913, p. 507.

longitudinal bundle in its course between the level of the sixth nucleus and the fourth and third nerves contains ascending fibers which are connected with the cells of the homolateral fourth and third nuclei. The sixth nucleus sends no fibers into the posterior longitudinal bundle, and no neurones connect the sixth nucleus with the fourth and third nuclei. Yet in all cases of loss of lateral conjugate eye movements, accompanied by preservation of the action of the contralateral internal rectus muscle in convergence, which have been carefully examined pathologically, Kidd says evidence is found of the presence of degenerated fibers in the posterior longitudinal bundle. Van Gehuchten expressed the opinion in 1892 that the posterior longitudinal bundle seems to be sufficient to carry out the lateral conjugate eye movements by means of the fibers which pass in that bundle to the various ocular nuclei. Many other authors have held the same opinion, and Kidd thinks we can have no reasonable doubt that this opinion is correct, and that the infra-cortical mechanism for the lateral conjugate eye movements depends on the ascending vestibulo-ocular fibers of the posterior longitudinal bundle.

If this be the correct explanation it is hard to understand how a lesion of nerve fibers of one ocular nerve could affect either of the other two ocular nerves. Why then do we get complete ophthalmoplegia in tabes or brain syphilis.

I have seen bilateral facial palsy in syphilis without any other symptoms and without any other nerve involvement, and the syphilitic meningitis must have picked out these two nerves alone. It is therefore possible that the ocular nerves should be paralyzed alone. Whether they are more susceptible to the syphilitic poison than are other cranial nerves is questionable. A more probable explanation, it seems to me, is to be found in the syphilitic meningitis which is most pronounced about the cerebral peduncles. Here the ocular nerves are near one another. The third nerve arises on the inner side of the peduncle, the fourth nerve passes on the outer side of the peduncle, and the sixth nerve takes its course directly forward on the pons from its exit

at the junction of the pons with the medulla oblongata, and comes close to the cerebral peduncle. We can readily understand why all the ocular nerves should be paralyzed in tabes or cerebral syphilis from meningitis about the cerebral peduncles, without implication of other cranial nerves, while such selective palsy would be difficult to explain on a nuclear hypothesis.

I have examined the sections from eleven cases diagnosed clinically as tabes. In all except two of these there was considerable lymphocytic infiltration of the pia and in some there was thickening of the pial vessels. In the two cases referred to above the lymphatic infiltration was slight, and in one of these the degeneration of the posterior columns was slight; it was incipient tabes. I could add to this number, but eleven cases seem to be sufficient to permit an opinion.

The question of lymphocytic infiltration has been studied by Bresowsky.[1] He examined the spinal cords from 40 cases of tabes and in all, old as well as recent cases, meningitis was found, and was of severe type in about half of the cases. He believes the tabetic degeneration depends on the meningitis which affects nervous tissue in lessened vitality and this brings about the degeneration. It would seem from such findings as these that sharp distinctions pathologically can not always be made between tabes and spinal syphilis, and the differentiation from a clinical aspect may be equally difficult. It is becoming more and more impossible to separate sharply the parasyphilitic diseases of brain and spinal cord from cerebrospinal syphilis. I believe if careful microscopic examination be made of the region of the origin of the ocular nerves in the brain stem in cases of tabes with ophthalmoplegia, with the attempt to determine whether the lesion be primarily within the nerves or their nuclei, it will be found impossible to regard tabetic palsies of ocular muscles as primarily nuclear in origin. Most cases come to necropsy so late that the nerve fibers and nuclei are both intensely altered. In some instances, as in the case reported in this paper, the degen-

[1] Obersteiner's Arbeiten, 1913, vol. xx.

eration may be found to be greater where the lymphocytic infiltration is more pronounced. I[1] have discussed the ocular palsies occurring in cerebral syphilis in another paper.

DISCUSSION

Dr. Charles K. Mills: There seems to be very little room for discussion of this admirable paper of Dr. Spiller. It is, however, another contribution to our exact knowledge of the well-known phenomena of tabes; and it is another contribution to assist us in bringing together so-called, parasyphilis and syphilis, or, rather to break down the artificial partition which has been reared for so many years between these so-called different specific diseases. Dr. Spiller's position is correct. We can understand some of the well known early phenomena of tabes better by accepting the position which Dr. Spiller takes with regard to these ocular palsies. It is a well-known fact to neurologists that in the early stages of tabes we frequently have present ocular palsies—at least, ocular pareses of very light degree. Diplopia is not at all uncommon, and it is also common for this diplopia to rather quickly disappear. I take it, it would not do this if, as we used to believe, the palsies themselves and other paralytic conditions of the ocular muscles were due to so serious an affection as nuclear destruction or degeneration. We can understand, therefore, accepting the views stated, how syphilitic disease of the meninges and of the nerve roots may do so well under specific treatment that the ocular pareses may disappear. Therefore, while there does not seem to be much field for discussion, Dr. Spiller having presented his views so well, his paper is a valuable contribution to our more exact knowledge of the subject of basilar syphilis.

Dr. Daniel J. McCarthy: In spite of this contribution that Dr. Spiller makes, I think we have to recognize both from a clinical and a pathological standpoint the clinical existence of tabes and paresis and the effect of therapeutic measures clearly distinguishes these conditions which might be called parasyphilitic conditions from the old conditions of secondary syphilis. I should like to ask Dr. Spiller to state whether in his study of these conditions, even before the modern attitude following Noguchi's discovery, if there was not a clear-cut histological division of the cases of tabes separate from the cases, pathological and histological, from secondary syphilis. Is the brain of cerebral syphilis any different

[1] Spiller, Van Gehuchten's Festschrift. Le Névraxe, 1913, vol. xiv.

from the brain of paresis? In our study of the clinical course of these diseases certainly syphilis of the brain and of the spinal cord reacts entirely differently to treatment with mercury or salvarsan from tabes or paresis. The accumulation of statistics from salvarsan and other treatment leaves little doubt that, while there is a certain amount of symptomatic improvement, there is little evidence of clear-cut cures in tabes, or in well developed paresis. The vast majority of paresis is getting worse under the modern method of treatment. That is the clinical picture apart from the histologic. There is a group of diseases of syphilitic origin which reacts fairly well to treatment. In the cases presented by Dr. Spiller there is a group of ocular palsies. Are these of nuclear origin, purely toxic, or are they manifestations of lymphocytic infiltration? Certainly the lymphocytic infiltration that we see in tabes we should not consider an active syphilitic meningitis. Occasionally you find these lymphocytic groups of cells in small nuclei. Whether the degeneration of nerves is primary or secondary there is no clinical method of determining the matter, because degeneration has occurred and the amount of lymphocytic infiltration today will be different from that found six or eight months ago. I asked Dr. Spiller whether his case was one of tabes or syphilis, and he replied, both. I would ask Dr. Spiller whether tabes still exists, or whether he would consider that all cases of tabes would be grouped together as spinal syphilis. My feeling is that we have distinct cerebral syphilis which reacts to treatment. Apart from this, paresis on the one hand and tabes do not react and when once developed, are practically incurable. The exception to this is that in tabes, in the beginning, you can reduce the lymphocytic count. But tabes today to me is just as serious as before the use of salvarsan and before the treponema was found in the central nervous system.

Dr. Spiller (closing): We recognize tabes and paresis, but we must regard them as truly syphilitic diseases. Tabes is not a rapid process and represents more chronic effects of syphilis, and is caused by the degeneration of the posterior roots from the syphilitic poison. There are cases in which a positive diagnosis between spinal syphilis and tabes can not be made, there are also cases in which the diagnosis between cerebral syphilis and paresis can not be made, and these cases show how close the connection between cerebrospinal syphilis and the so-called parasyphilitic diseases may be. I have frequently found the typical degeneration of the posterior roots of tabes associated with the most typical finding of cerebrospinal syphilis, viz., the lymphocytic infiltration of the pia. I have for many years been studying the effects of syphilis on the nervous system, both clinically and pathologically, and from a reading of the extensive literature on the subject have formed the opinion expressed in my paper.

PAIN AND TENDERNESS IN DISEASES OF THE SPINAL CORD AND THEIR SURGICAL TREATMENT[1]

By CHARLES A. ELSBERG, M.D.
OF NEW YORK

(From the Surgical Department of the New York Neurological Institute and the Third Surgical Service (Dr. Elsberg) of Mount Sinai Hospital)

The tremendous development of abdominal surgery has brought with it a great advance in our diagnostic acumen. Not a few books and monographs on the special subject of abdominal pain and abdominal tenderness have been published. Strange to say, however, the authors have devoted little attention to the neural origin of many cases of persistent abdominal pain. The more one keeps in mind the possibility of this source of origin, the more one will meet with cases in which the symptoms will be found to be due to a lesion or disease of nerves, nerve roots, or nerve centers, and the more important will become this aspect of the subject.

The abdominal symptoms of locomotor ataxia are well known; yet, in not a few cases, operations upon the stomach have been performed for supposed gastric disease when the real trouble was gastric crises in the course of tabes. During the past five years two patients have been sent into my service in one of the hospitals in New York with the diagnosis of acute appendicitis; in both instances the patients had Pott's disease with irritation of spinal nerve roots, and areas of skin and muscle tenderness in the right iliac region. I have personal records of three patients in whom

[1] Read November 4, 1914.

various operations had been performed, a floating kidney anchored, the appendix removed, the gall-bladder operated upon, in one case a hysterectomy performed for pain and tenderness in the lumbar, right iliac, and right hypochondriac regions, finally they were found to have a spinal tumor or a neuritis of the nerves of the cauda equina. Another patient was operated upon for supposed gangrene of the toes with severe pain shooting down the leg; she was finally relieved of her painful symptoms by an operation for spina bifida occulta. The areas of gangrene on the toes were trophic ulcers due to the spinal disease. Many patients are treated for a "neuritis," brachial, sciatic, peroneal, etc., for long periods of time until finally the diagnosis of spinal disease, tumor, gliosis, malignant disease of the vertebræ, is made. We now know that painful sensory disturbances referred to the extremities frequently occur in disease of the optic thalami and corpora striata.

On account of the importance of this subject, therefore, it may be of interest to recount to you some of the experiences that I have had and some of the conditions I have met with during five years of spinal surgery, the anatomical conditions found at operation, and the surgical methods by means of which relief was given.

Pain in the Extremities Due to Spinal Disease. In order to understand the distribution of painful symptoms in the extremities, a few words regarding the anatomy of the spinal nerve roots may be of value. As I have elsewhere shown, there is a marked difference between the cervical and upper dorsal, and the lower dorsal and lumbosacral posterior roots. In the latter the nerve fibres which originate from the cord soon unite to form one bundle —the posterior nerve root; in the former, however, the bundles of fibres which originate from the cord along a line from one to one and a half centimeters in length do not unite to form the posterior root until near to where they perforate the dura. As a result, a tumor may press upon some of the nerve bundles without compressing the entire spinal root. This anatomical arrangement enabled us to understand the early symptoms of a patient from whom I removed an extramedullary tumor of the spinal cord

between the seventh and eighth cervical segments, whose first and for a long time only symptom, was a painful pin and needle sensation in the index finger of the left hand. At the operation the tumor was found to have pressed upon only the lower nerve root bundles of the seventh cervical posterior root. From several cases of this kind, I feel justified in making the statement that of the nerve bundles which make up the seventh cervical posterior root the lower supply the index finger and the upper the thumb, an interesting fact for finer spinal localization.

I have operated upon a patient whose only complaint was excruciating pain on the upper and outer side of the right thigh. She had been thrown out of an automobile about one year before, but was unaware that she had injured her back. There was an area of superficial hyperalgesia extending over the posterior and outer surface of the thigh, outer surface of the knee and anterior and inner aspect of the leg. This and another similar case allowed me to map out a somewhat different area of supply of the fourth posterior lumbar root than had been supposed heretofore. At the operation upon this patient, a ruptured ligamentum subflavum was found to have compressed the fourth lumbar root, and with the excision of the ligament the pain disappeared.

Abdominal Pain in Spinal Disease. As a preface, a brief consideration of some aspects of abdominal pain may not be out of place. There are many abdominal disturbances that patients suffer from which are but little understood. Physical examination only too often will fail to demonstrate anything excepting tenderness perhaps most marked in one or the other part of the abdomen. Some of the patients are neurasthenic or have become so, but very many are normal and well-balanced individuals. It is wrong to tell these patients that they have nothing the matter with them and to send them away after unsuccessful treatment, often into the hands of quacks, Christian scientists, or faith healers. Nor does it help to characterize the condition by vague names, to speak of painful aortas, of neuralgia of the sympathetic (Buch). Not a few of the patients are finally operated upon and too often without benefit. An appendix, perhaps not quite normal, is

removed, the gall-bladder is explored and perhaps a few calculi extracted, various operations done upon the female adnexa and uterus. After these "surgical decorations," as Mayo calls them, the patients are often as badly off as ever. There are fads in medicine and the latest is to explain the symptoms by a mobile cecum (the German point of view) or a membrane which prevents freedom of peristalsis (the American point of view). Of course the one or the other of these views may sometimes be correct, but probably in most instances both are wrong. In passing I would say that in my experience those who have changed from an active to a more sedentary life are peculiarly apt to suffer from a variety of abdominal disturbances. Many of these patients are subjected to operative interference, but I have again and again found that the abdominal disturbances will disappear after the patients again take regular exercise.

If we see this type of patient, we should never omit to make or to have made a careful neurological examination. In my last 100 laminectomies for spinal disease, I have performed six operations on patients who had been treated for long periods for abdominal symptoms. In four of the six patients I found and removed extramedullary or extradural tumors from the spinal cord. Therefore, in every case of indefinite abdominal pain and tenderness it is advisable to make certain that we are not dealing with a cutaneous hypersensitiveness which so often stimulates real abdominal tenderness.

Mrs. W., aged forty-three years, was first seen by me in 1912. For two years she had been having frequent attacks of pain in the lower abdomen on the left side. The patient was married and had a number of children; cystocele and rectocele operations had been done in the attempt to relieve the pain; the appendix had been removed. She had been *x*-rayed and cystoscoped and her ureters had been catheterized, she had received a great many remedies, but the abdominal symptoms were unrelieved. Otherwise she complained of no symptoms.

The patient was a stout woman, looking the picture of health. Careful examination revealed the fact that the abdominal pain and tenderness were really due to a superficial skin tenderness and that this was limited to the distribution of the twelfth dorsal root on the left side. The patient

had a slightly exaggerated knee jerk on the left side with a slight tendency to ankle clonus. On the right side there was slight hypesthesia and hypalgesia over three toes with a diminution in the acuity of deep muscle sense in the right big toe. The Wassermann reaction and x-ray examination were negative, and the spinal fluid showed a normal cell count. The diagnosis of a small tumor pressing upon the twelfth dorsal root was made. With the removal of a fibroma of the size of an almond, the patient recovered. For almost one year she complained of slight pain over the area where she had had pain before the operation, but this pain gradually disappeared.

I have several times observed this persistence of slight root pains after the removal of a spinal tumor. It is no doubt due to changes in the nerve which had been long pressed up upon, and it is advisable to divide the spinal root in question. The division of such a posterior root will not give rise to any symptoms and will of certainty prevent the neuritic pain. There are, however, some painful disturbances which may persist for some weeks after the removal of an extramedullary or intramedullary newgrowth which must be considered as central pain, protopathic in character.

The relief of the gastric crises of tabes by means of division of posterior roots was first recommended by Foerster, of Breslau. As is often the case, the first results that were reported were successes; then the frequency of failure caused the operation to be modified and extended. In the beginning Foerster recommended that three to five spinal roots should be divided, later he advised that eight posterior roots, the fifth to the twelfth dorsal, should be cut. Even this extensive root section (requiring an extensive laminectomy) often failed to control the attacks, and the vagus was blamed for the failure. The present status of the matter is that extensive root division will often benefit the patients but in only a small percentage will a recurrence of the gastric and intestinal crises be prevented. I believe that before doing a root section for gastric crises, the surgeon should always give the patient a preliminary intraspinal injection of stovain; by this means one can gain a fair idea of the prospects of success from the division of posterior roots.

I cannot pass over the subject of pain in spinal disease without paying a tribute to the Philadelphia neurologist and surgeon who originated a very valuable operative method for the relief of severe pain of peripheral or of spinal origin. There is nothing more horrible than pain suffered by unfortunates with metastatic malignant disease of the spinal column. The patients may remain alive for months or years, the amount of relief afforded by drugs and anodynes is small, division of posterior roots will seldom permanently stop the pain. Although the reason for this is not known, division of posterior roots for the relief of pain will often, no matter how extensive the root division, fail to be of benefit. When, a few years ago, Spiller and Martin proposed that the anterolateral tracts in the spinal cord, those tracts in which lie the pathways for pain, be divided, a real advance in therapeutics was made. My experiences with the operation of Spiller and Martin have been small up to the present time. I have had only two cases, but the results in the patients were satisfactory. The method is based upon a sound anatomical and physiological foundation, great relief has been afforded to the patients and in most of the cases in the literature, and the future for the operation is a very bright one. In several cases in which the operation was not entirely successful, the division of the anterolateral tracts was not made high enough in the cord or the tracts were not completely or not correctly divided.

An interesting subject, and one concerning which up to the present time very little is known, has occupied some of my time and attention. Is the spinal cord sensitive to pain? Or is it insensitive like the brain?

I have carefully watched and questioned a large number of patients upon whom a lumbar puncture was done. I have further made some observations in patients upon whom a spinal operation was done under local anesthesia. Finally, I have attempted to learn something on this subject in the course of some experiments upon animals.

The outer surface of the dura is insensitive to touch or when it is rubbed or scratched with a needle. The inner surface is,

however, very sensitive and gentle handling is felt as a painful sensation by the patient. The dentate ligament is insensitive; it can be grasped with a forceps and cut without any complaint by the patient. The surface of the cord is not sensitive to pain excepting along the line of origin of the nerve bundles which unite to form the posterior spinal roots. An incision can be made into the cord without the patient feeling it, but in one instance in my experience the patient complained of a burning sensation in one leg while the cord was being pulled upon. This may have been due to traction on a spinal root, or may have been one of those central pains of which I have already spoken.

The most sensitive part of the posterior spinal roots is just at the point where they perforate the dura. This may be contributed to by the peculiar course of the nerve roots at this point. I have recently called attention to the peculiarities in the course of many of the nerve roots. At many levels they are bent at a more or less acute angle as they pass through the intervertebral foramina. In the cervical and upper dorsal regions, the nerve bundles unite to form the posterior root and pass out of the dural sac at almost a right angle to the cord. They perforate the dura and enter the posterior ganglion. From the ganglion, each root passes outward with a slight inclination upward. From the eighth cervical to the mid-dorsal region, the course of the posterior root is a different one. Each root has an inclination downward until it nears the dura; it bends upward at an angle just as it perforates the dura. In the mid dorsal region this angle is often very acute, 40° to 45°. Taking into account the peculiar course of the nerve roots just mentioned, and the sensitive dura, it is easy to understand why a small metastatic focus of malignant disease in the posterior and lateral part of the body of a vertebra may cause those agonizing root pains from which the patients suffer, which may defy even the largest doses of morphine, and which can only be relieved by the division of the anterolateral tracts of the cord recommended by Spiller and Martin. It is easy to understand also that only a slight inflammatory process near the dural opening may cause very marked root pains.

A Peculiarity in the Sensory and Motor Symptoms in Some Cases of Spinal Tumor. In the later stages of spinal compression the typical Brown-Sequard syndrome, motor symptoms on the same and sensory symptoms on the opposite side to the lesion, can no longer be recognized. But in slight compression of the cord the clinical picture may be clearly outlined. In some cases in the literature and in several patients whom I have operated upon, the root pains and the loss of sensation below the level of the lesion were on the same side as the tumor, and the paralysis and other motor symptoms mainly on the opposite side. In other words, the motor symptoms were on the side on which most sensory symptoms usually occur, and the sensory disturbance on the usual motor side. How can such a condition of affairs be explained? In the lower lumbar and sacral cord, the explanation is easy. Here the cord segments occupy so little space and lie so near together, that a tumor will usually compress most of the nerve tracts which have already crossed and will also catch those that pass to the other side. At higher levels of the cord, however, the segments are longer and hence in early compression of the cord a more or less well-marked Brown-Sequard syndrome can occur. In one patient from whom I removed an extradural tumor from the mid dorsal region, the root pains were on the side of the tumor as was also the anesthesia below the level of the lesion. Most of the motor disturbances were on the opposite side. At the operation I found the explanation for the symptoms. The tumor had pushed the cord over to the other side so that it was compressed against the wall of the spinal canal, the cord was partly protected from direct pressure by the tumor by the large amount of fluid within the arachnoid on that side of the cord. In other words, the same thing happened as we sometimes see in tumors in the posterior cranial fossa, where a right-sided cerebellar neoplasm may push the cerebellar lobes to the other side so that the left facial nerve is pressed against the petrous portion of the temporal bone with a resulting left facial paralysis.

If we study the symptoms due to compression of the spinal

cord from this point of view, we shall learn not a little regarding the pathological mechanics of spinal compression.

This may lead to a more intensive study and comparison of the sensory and motor disturbances which occur on each side of the body when the spinal cord is pressed upon by a newgrowth or as a result of an inflammatory or traumatic lesion. With this object view, I have presented to you this evening these few rather fragmentary remarks upon the symptom of pain, and of other sensory disturbances, in diseases of the spinal cord.

DISCUSSION

Dr. Charles W. Burr: In my own experience, I have had many interesting questions arise as to the meaning of pain, and many of them are still unsolved. I remember very well, some years ago, a patient, first seen by Dr. Wharton Sinkler, sent to him complaining of diffuse pain in the right arm and nothing more; almost everybody said it was hysteria, and some said it was not pain at all—that she just wanted to be sick. Dr. Sinkler was unable to make a diagnosis. About a year or eighteen months later she fell into my hands, and at that time there was a little wasting—not very much—but still a little wasting in the muscles around the thumb. The pain was still diffuse over the entire arm, and she could not tell whether it was superficial or deep-seated. Her intelligence was not high enough for that; all she could say was that the arm hurt. I called it a brachial neuritis. After a while the pain was replaced by painful anesthesia, marked wasting, and a gradually increasing palsy in the whole arm. Then the picture was that not only of disturbance of the nerve but also of the anterior horns of the cord. After a while she died. (This was long before anybody did any operations upon the spinal cord.) At postmortem there was found in the cervical region a long, flat growth that had involved the nerve roots, causing palsy and wasting. Then, not merely irritation at the posterior roots, but destruction and anesthesia with pain. Now, had we known what was really the matter with that woman an operation could have been done, saving her a tremendous amount of pain and probably her life. Death occurred from pressure upon the high cervical cord.

With reference to the pain of locomotor ataxia, I think every neurologist constantly has men sent to him with locomotor ataxia who are supposed

to have every disease from "muscular rheumatism" to anything you like. Surgeons also see locomotor ataxia, sent to them for operation upon the bladder, stomach, rectum, legs, or any other part of the body. The more we can learn of the distribution of pain in reference to the nerve roots affected, the more we shall be able to do in all of these cases.

I was very much interested in what Dr. Elsberg said about the fibers of the posterior roots in the cervical cord not uniting until they get in or through the membrane; whereas, those of the dorsal lumbar cord unite very early and come into the membrane as a solid body. This will explain many of the anomalies in cervical root pain compared with root pain lower down in the spinal cord.

Dr. Charles H. Frazier: My experience in operating for the relief of pain consequent upon spinal lesions has been confined to cases of tumors operable and inoperable of tabetic crises, and of persistent neuralgia following injuries to the brachial plexus. Before discussing the surgical treatment of pain, I should like to comment upon pain in relation to spinal tumor. It is, I think, too commonly supposed that pain is a constant and conspicuous symptom of spinal tumor referred to the peripheral distribution of the segment involved, and with this conception in the absence of pain, exploration for spinal tumors is often deferred or altogether abandoned. At the last meeting of the American Neurological Society, the sentiment prevailed that exploratory operation should be resorted to with very much greater frequency in obscure cases when a positive diagnosis could not be made.

A number of cases of spinal tumors have been observed, if I remember rightly, five by a single observer, Schultze, in which throughout the course of the lesion, there was absolutely no pain. Not only may pain be absent, but when present, may be misinterpreted, as when referred to a visceral organ or when referred to a point distant from the lesion. When a tumor on the anterior surface of the cord, when it does not involve the roots, when by pressure on the tracts in the cord the passage of sensory stimuli are arrested, it is easy to explain the absence of pain.

There is no doubt by the removal of the tumor that pain may be relieved, nor is there any doubt that in certain cases of tabetic crises and pain from other causes, section of the sensory roots will give relief. In my own experience I have seen it in gastric crises, in metastatic tumors of the vertebra, in inoperable carcinoma of the breast.

One has but to review his experience with rhizotomy to be impressed with one fact, namely, the variability of the results. In other words, cutting a given number of roots is not always followed by the same results. In some instances, there may be partial, in others complete relief, in some cases there is partial, in some complete anesthesia, in some permanent, and in others transitory results.

These widely varying phenomena would seem to throw some doubt upon the present conception of the pathways of afferent impulses and suggests an inquiry as to whether the ventral roots may not play some part in carrying of afferent impulses an hypothesis which has already been advanced by Kidd.

This commentary which I made two years ago, was brought to mind upon seeing the report of a case operated upon by Mr. Kilvington in which section of both the anterior and posterior roots was followed by absolute relief of pain in case of intractable neuralgia, following amputation of the arm. This is a very significant statement as the results of rhizotomy for the relief of pain in the upper extremities following traumatic amputations or injuries to the brachial plexus have been very discouraging. The unsatisfactory result following rhizotomy for gastric crises may be due on the one hand to dual origin of the pains, *i. e.*, whether they are of sympathetic or pneumogastric origin. Naturally when of pneumogastric origin section of the dorsal roots will be ineffective—Exner's operation (section of the pneumogastric) is objectionable because it disables the motor function of the stomach. Foerster was venturesome enough to divide the sensory roots of the vagus, at their origin from the medulla, leaving the motor roots intact, but the patient died.

The number of roots to be cut has been pretty definitely established and needs no further comment. The selection of cases, however, is of considerable importance.

Whenever possible, a therapeutic test should be applied before the operation, in order to determine whether interruption of the sensory impulses does relieve pain. This is readily tested by an intraspinal injection of stovaine. If following this injection, the patient is entirely relieved, there is reasonable assurance of relief following resection of the posterior root.

Spiller's suggestion of resection of the anterolateral column of the cord, is a most valuable one, and although I have had no opportunity as yet, of making use of this method, it is one which appeals to me, particularly in cases of uncontrollable pain of the lower extremities. This more especially, as the operation does not necessitate the removal of as many laminæ of the spine as would be necessary to cut the required number of lumbar and sacral roots. A very striking and a positive proof of the efficacy of this operation was illustrated in the case reported last year by Dr. Beer of New York. Generally speaking, the results of these various methods for relieving pain justify the undertaking, judging from my own results and those of others.

Perhaps the most serious objection to the operation is its mortality rate. In the limited number of root resections for pain in my own clinic, there have been no fatalities, but in larger series, performed by a number of

surgeons, the mortality rate has been estimated at 10 per cent. This, I believe, is too high and the risks of the operation should be materially reduced. The low rate of mortality in my own experience with the operation of laminectomy, I attribute chiefly to two factors: One the use of intratracheal anesthesia, the other the use of the stovaine block. There is no doubt but that the manipulation of cord and root is productive of shock, and if the harmful afferent impulses can be blocked, as they can be with stovaine applied to cord and roots, above the seat of operation, we have a ready means of applying the principle of anoci-association to spinal cord operations.

Dr. Elsberg (closing): I have nothing to add, with the exception that if I had spoken of the crises of tabes and their treatment by section of the posterior roots, I should have said I am not very enthusiastic about the operation of cutting posterior spinal roots, based upon four experiences I have had. Professor Foerster told me when he was here last Spring, (and he has written since) that the only way to get a fairly good result is to cut all of the posterior spinal roots from the fourth or fifth dorsal right down to and including the twelfth; in other words, an enormous laminectomy has to be done, and even then, the result is not certain. I have several times injected stovaine into the spinal canal and seen temporary benefit from the injection. I may say that the mortality of laminectomy should be very small. We have had 98 successive cases without mortality. It is an operation that, after a little experience, any surgeon should be able to do without any trouble.

THE CELLULAR FACTOR IN INFECTIOUS DISEASES[1]

By DAVID RIESMAN, M.D.

The prevailing conception of an infectious disease is that it is due to the poison of a parasite microörganism. In some instances the poison is a soluble substance secreted by the bacterium. This is the case in diphtheria and in tetanus. In others the poison is not a secretory product, but is inherent in and is part of the body of the parasite, becoming liberated only when the latter undergoes dissolution. This is the case in typhoid fever and in tuberculosis. The first-mentioned poisons, those that are of secretory origin, are called exotoxins, and those contained in the bodies of bacteria endotoxins. The earlier belief that bacteria act mechanically has been given up for the greater number of microörganismal diseases. In malaria the responsible factors are conceivably twofold: (1) the destructive influence of the parasite on the red cells, and (2) the toxins liberated when the ripe plasmodium bursts its confining membrane and leaves the damaged cell.

Regarding endotoxins, it should be stated that a number of observers, among them Friedberger,[2] Zinsser[3] and others, have questioned the existence in bacterial bodies of endotoxins in the sense of preformed poisons. Recent experiments seem to show that through gradual digestion of the bacteria by means of antibodies, which are of the nature of ferments, a toxic cleavage product arises which is apparently the same for all bacteria and is

[1] Read December 2, 1914.

[2] Quoted by Dold and Hanau, Zeitschrift f. Immunitätsforschung und experimentelle Therapie, 1913, xix, 31.

[3] Journal of Experimental Medicine, 1913, No. 2.

by some held to be identical with the anaphylactic poison of Friedberger and the toxic split protein of Vaughan. Such a poison is no more preformed in the bacterial protein molecule than alcohol can be considered preformed in the molecule of sugar from which by the fermentative action of the yeast cell it is derived. It is, however, foreign to my paper to discuss this controversial subject. I will only state that there is a good deal of doubt whether the anaphylatoxin is a non-specific protein. Von Behring[1] has recently maintained that anaphylaxis depends upon a specific agglutinizing effect on the blood platelets whereby they are constituted into emboli that plug the cerebral vessels, an hypothesis that seems to be put in question by the distinctly local effects of anaphylaxis and by the fact that anaphylactic shock can be produced in animals after severance of the cord.

Whatever the nature of the bacterial poison may be, the constitutional symptoms of an infectious disease are by all writers referred directly to the circulation of bacterial toxins. And many of the local changes such as the degeneration of parenchymatous organs, are attributed to the same cause. Take diphtheria, for example, the general symptoms—fever, prostration, albuminuria, delirium, anemia—are supposed effects of the toxins. So are the circulatory changes, the cardiovascular weakness. The swollen glands and the false membrane formation are attributed to the local action of the toxin.

With regard to typhoid fever, the views are very much the same. The so-called constitutional symptoms of the disease—fever, headache, prostration, delirium, carphologia, intestinal tympany, and albuminuria—are attributed to the presence in the blood of the endotoxins of the typhoid bacillus. These same poisons are held responsible for the intestinal lesions, the changes in the lymph glands, the bone marrow and spleen, and the parenchymatous degeneration of the heart, liver, kidney, and voluntary muscles.

In tuberculosis the symptoms are ascribed either to the tubercle bacillus, that is to its poison, or to a mixed infection of this micro-

[1] Deutsch. med. Woch., October 15, 1914.

organism with pyogenic bacteria. In other words, our present conception of the infectious diseases emphasizes solely the toxemia produced by the causative parasite. Is that view adequate? Is it correct? Before answering these questions, permit me to go back a little in time. A decade and a half ago, while actively engaged in pathological work, I chanced to make an autopsy at the University Hospital on a case of general carcinomatosis, the symptoms of which had closely resembled an acute infectious disease, the last phase being a comatose state. At the autopsy the peritoneum was found everywhere dotted with small whitish nodules, indistinguishable on naked-eye examination from miliary tubercles. However, the discovery of a primary cancer in the rectum and the characteristic histology established the carcinomatous nature of the lesions.

About the same period I had under treatment a man with miliary tuberculosis in whom the disease was with difficulty distinguished from typhoid fever. He died at the end of an acute illness of three weeks' duration, the autopsy revealing everything densely peppered with equal-sized, firm, gray tubercles.

These two cases made a profound impression upon me—clinically so similar, etiologically so different, and the second so much like typhoid fever. I concluded that the three diseases must have something in common. The slightest acquaintance with pathology shows that the most striking thing they have in common is a tremendous cell proliferation. In a paper written at the time (in 1899) I made these cases the basis of an hypothesis which in its essential features is the same as that I wish to present tonight. Permit me to read a few lines from this juvenile essay.[1] "The death in miliary tuberculosis cannot be explained by the destruction of tissue or even by the invasion of a vital part by the tuberculous process. The reason always given is that it is due to toxemia, through poisoning with the products of the tubercle-bacillus. I would not deny that the bacillary poisons play an important role, but attention, so far as I know, has not been called to the part taken by the myriads of new cells that

[1] Riesman, Philadelphia Medical Journal, February 4, 1899.

are added to the body in the course of two or three weeks. When we reflect that every living cell forms metabolic products, that cell-multiplication is probably always accompanied by the excretion of certain materials, we must conclude that during the formation of the countless host of tubercles, with their infinite number of cells, a large quantum of metabolic substances is thrown into the circulation for the system to deal with as best it can; and when, under the influence of the bacillus, some of the cells break down, more soluble matters are washed into the blood, it seems but reasonable to conclude that the body cannot rid itself of that enormous quantity of metabolic products, even if this material were normal in character, and if it is, as we may justly assume, *not* normal, then the result can only be a profound intoxication. Add to this '*metabolic toxemia*,' as I would call it, the bacterial toxemia produced by the bacillus, and the cause of death becomes clear."

For the moment I will leave out of consideration the carcinoma case and will confine myself to a discussion of miliary tuberculosis and of typhoid fever.

A miliary tubercle consists of a vast aggregation of epitheloid cells together with some giant cells and many lymphocytes—cells for the greater part, if not altogether, newly formed in response to the stimulus of the tuberculous poison. The number of cells in a good-sized tubercle is theoretically not beyond computation, but I know of no reliable estimate and for practical purposes the number is infinite. With regard to the tubercle bacilli, their number in a tubercle probably varies, but to all intents and purposes is also uncountable. When we consider the larger tuberculous areas, as in caseous pneumonia, both the cellular and the bacterial quantities must be expressed by the sign for infinity. I do not know how long it takes a tubercle to form, but it would seem that the cells multiply nearly as fast as the bacteria. In the course of two or three weeks there are thus added to the body in a case of miliary tuberculosis a quantity of new cells wholly beyond the power of the mind to conceive. These cells grow by utilizing the elements of the blood, chiefly the big

protein molecule. In their period of active multiplication they take from the blood-stream what they need and cast back into it the unused remains. If the new cells are native to the place where they are formed then the cast-off products of their activity may be normal, though it is possible that they are formed in such quantity in a short time that the power of the system to deal with them is overtaxed. If we assume that, since the cells are formed under pathological conditions, they are not exactly like the old cells of their locality, then the possible harm done in their growth by abstraction and addition is even more readily conceived.

There is, however, another and probably more important factor to be taken into account in determining the fundamental causes of the symptoms of miliary tuberculosis. The newly formed cells soon die, by undergoing a peculiar change known as caseous degeneration. It is interesting to know how this is brought about. Some have ascribed it to the poison of the tubercle bacillus, others to starvation through inadequate circulation, and still others have held that the cells might be *ab initio* poorly endowed. The real explanation for the death of the cells is probably to be found in the newer theories of ferment action, especially in the theory of parenteral digestion advanced by Abderhalden. Abderhalden, as is well known, finds that if a foreign protein, which, were it introduced through the alimentary canal, would be digested there, is introduced under the skin or into the blood or anywhere except into the digestive tract, it excites at once the formation of ferments that breaks up the foreign protein into its so-called "building-stones." This dissolution of the protein by the appropriate ferments is a true digestion and since it occurs outside of the alimentary canal is called *parenteral digestion.* It is possible by physicochemical methods and by certain optical tests to demonstrate the presence of these proteoclastic ferments through their resultant products in the blood. The recent reports before the Section in Medicine by Drs. Sailer, Schnabel and Williams have brought out the main points of the Abderhalden theory.

I have looked in vain in English literature for a satisfactory

rendition of the important terms created by Abderhalden to elucidate his theory. I have therefore endeavored to meet this lack by a series of new terms as shown in the following table:

Abderhalden Term	Proposed Term
Körpereigen[1]	Idiosomatic
Körperfremd	Allosomatic
Bluteigen	Idiohematic
Blutfremd	Allohematic
Zelleigen	Idiocellular
Zellfremd	Allocellular
Arteigen	Idiogeneric
Artfremd	Allogeneric

A word about the derivation of these terms, in particular the prefixes, may not be amiss. "Idio" is derived from ἴδιος, one's own, private, peculiar (οἱ ἴδιος, friends). "Allo" comes from ἄλλος, other, foreign. Idiocellular and allocellular are, I confess, hybrids, but they are more euphonious, I think, than idiocytic and allocytic.

To return to the tubercle. As stated, the cells of the tubercle undergo a sort of digestion[2] which in the ordinary case does not go on to complete solution of the tubercle. The failure of digestion to be complete, Jobling and Peterson[3] attribute to the presence of soaps which act as ferment-inhibiting substances. Under certain conditions not clearly understood—Jobling and Peterson believe that mixed infection is necessary—complete solution occurs with the disappearance of the tubercle. This is proved clinically by indubitable cases of cured miliary tuberculosis of the meninges and by the proved disappearance of even large tuberculous foci and masses in the lung and peritoneum. In the removal of some of the products, phagocytes may be active; but the digestion itself is a chemical process.

[1] Gavronsky and Lanchester (Defensive Ferments of the Animal Organism, New York, 1914), in their otherwise very satisfactory translation of Abderhalden's book, use the rather cumbersome terms "in harmony with the body" and "out of harmony with the body" for the words körpereigen and körperfremd.

[2] Bergel, Münch. med. Woch., 1909, lvi, 64, has demonstrated the presence of lipase in the lymphoid cells of the tubercle.

[3] Jour. Exper. Med., 1914, xix, No. 4.

We have then in tuberculosis myriads of cells undergoing parenteral digestion and in consequence throwing into the blood products that if not qualitatively are at least quantitatively abnormal. It is my belief therefore that in acute miliary tuberculosis, and indeed in all other forms of tuberculosis, a large share, not yet measurable, in the production of the symptoms must be given to the substances liberated by the living and dying pathological cells.

I will now pass on to typhoid fever. I may state at once that in general what I have said of tuberculosis holds true of this disease. The typhoid bacillus enters the body through the intestinal canal, gets into the intestinal lymphoid tissue, into the lymph glands, the bone marrow and the spleen, and provokes in all of these places in an exceedingly short space of time a truly colossal proliferation of cells. I exhibit here several specimens of intestines in which Peyer's patches reveal themselves as large fleshy masses. The normal spleen weighs about 200 grams, the typhoid spleen probably five or six times as much. Even if some of this additional weight is blood, because of active congestion, the greater part is constituted by new cells developed in the course of a week or ten days. The lymph glands of the mesentery are normally scarcely appreciable to sight. In typhoid fever they may be as big as walnuts. When we contemplate it, is not this increase in cells staggering to the mind—an increase quite on a par with the stupendous multiplication of the bacteria? This extraordinary cell proliferation is achieved by complicated processes in which, as Dr. Reichert[1] has just shown, the cells convert the stereoisomers of the blood into their own specific proteins. The conversion involves such tremendous cleavages and reconstructions that, as mere manifestations of dynamic energy, they might be compared to the manifestations of radio-activity.

Adapting a further thought from Reichert, I might say that the typhoid bacillus, after entering the body, disturbs the physicochemical equilibrium and initiates a series of reactions that go

[1] Science, November 6, 1914.

on from step to step until the end of the process, a physicochemical equilibrium which is either recovery or death, is reached. The beginning of the process—the first step—absolutely and inevitably determines the end, a sort of predestination not dreamt of in John Calvin's philosophy. All the changes from the liberation of the typhoid poison to complete autolysis of the newly formed cells are produced by the action of appropriately geared ferments. These changes are all connected and in their totality they constitute the disease, typhoid fever. Viewed from this aspect, the symptoms of typhoid fever are a composite of the bacterial and the cellular toxemias and are not the result of the typhoid toxemia alone.

Naturally it is difficult at this time to say what part of the symptomatology of typhoid fever is bacteriotoxic and what part is cellulotoxic, nor have I any clear idea how the problem is to be solved. Perhaps the Abderhalden test, employing spleen, bone marrow and lymphoid tissue as substrate, may show corresponding ferments in the blood. While that demonstration would not, *ipso facto*, be proof of toxic action, it would open the way to further research.

Pneumonia is another disease in which the bacterial toxemia has been overemphasized to the exclusion of everything else. It seems to me not at all improbable that some of the general symptoms are due to the exudate, independently of the bacteria.

Friedrich Müller and later Flexner[1] showed that the resolution of the exudate—the autolysis—is a fermentative process. Why may not active substances be liberated in this process inasmuch as autolysis is an ideal example of parenteral digestion? It seems to me quite probable that the crisis is due to this factor rather than to bacterial antibodies. A study of the amino-acids in the blood and animal experimentation with extracts of pneumonic lung may help to solve the problem.

If anyone sufficiently interested will think over the remaining bacterial diseases, other examples of cellular toxemia will suggest

[1] University of Pennsylvania Medical Bulletin, July-August, 1903.

themselves. There are, for instance, the ordinary pyogenic infections in which leukocytic infiltrations occur outside of the bloodvessels. These infiltrations undergo digestive autolysis, whereby active substances may be turned into the circulation. The so-called Fochier's abscess (*abcès de fixation*) illustrates this possibility in an empiric way. That leukocytes may be active in the body for which they are körpereigen = idiosomatic, is shown by the recent observations of Moreschi[1] and of Rotky.[2] Both found that the leukocytes in leukemia destroy the power of agglutinin formation in typhoid fever and other infections. The effect of the *x*-ray upon the spleen in leukemia and other diseases, an effect manifesting itself by fever, prostration and metabolic changes, is another evidence of the possibility of cells from the individual's own body, in other words, idiosomatic cells, developing toxic power. It may also not be irrelevant to mention that Krehl[3] attributes the fever frequently noticed in pernicious enemia to elements derived from the disintegrating red blood corpuscles.

The interesting observations of Flury[4] are also in line with my hypothesis. Flury believes that the symptoms of trichinosis are in part due to the trichinæ acting mechanically and to a poisonous substance which they contain; in part, however, to the chemical products that arise from the degradation of the invaded and damaged muscle tissue of the host.

With regard to malignant disease, the case I mentioned earlier in my essay finds a fairly satisfactory explanation if we assume that the theory or hypothesis of "cellular toxemia" is correct and of general application.

I have no doubt that the thoughts here expressed have in some form occurred to other men; yet I have looked in vain in medical literature for any allusion to the cellular factor in disease, apart of course from any local effects. The splendid *Traité de Pathologie*, by Bouchard and Roger, is, as far as I have been able to

[1] Zeitsch. f. Immunitätsforschung und experimentelle Therapie, 1914, xxi, 410.
[2] Zent. f. inn. Med., October 24, 1914, No. 43.
[3] Pathologische Physiologie, Eighth edition, Leipzig, 1914, p. 145.
[4] Arch. f. Exper. Path. u. Pharm., 1913, lxiii, 166.

determine entirely silent on the subject. It is true, reference is made to the action of the lymphatic glands in infectious diseases, but chiefly in their mechanical relations as filters, or, as I would call them, barrier-forts, as distributors of infection, and as sources of phagocytes, not at all to the possibility that the products of the lymphoid cells, living or dead, may contribute an active something to the circulation.

On the basis of the theory or hypothesis here advanced a new classification of bacterial infections suggests itself. We may make two great classes:

1. The productive infectious diseases, characterized by cellular proliferation.

2. The non-productive infectious diseases, not so characterized.

To the first class belong tuberculosis, typhoid fever, and pneumonia.

In pneumonia the cells of the exudate may not be all newly formed. They may have been called forth from the cell depots in the blood and elsewhere. They are, however, new in their pulmonary site, and in the Abderhalden sense are out of place.

To the non-productive bacterial diseases belong diphtheria and tetanus.

A closer study of this classification reveals an extremely interesting point, namely, that the infections classed under 1, that is, the productive infectious diseases, are all due to bacterial endotoxins, or, in the sense of Vaughan, to split proteins, while those in class 2, the non-productive infectious diseases, are due to the soluble toxins and not to poisons contained in the bacterial bodies. Whether this is a general biologic law, I do not know.

In conclusion, I beg to express the hope that men devoting themselves to research, if they find anything suggestive in the hypotheses advanced, will test them by the experimental method.

DISCUSSION

Dr. John A. Kolmer: I feel that Dr. Riesman's paper has drawn a deserved attention to an important fact, one which students of infection are likely to neglect; that is, the role that toxic products produced by new cells the result of infection may assume in the process. Personally, I believe that he has renewed interest in a subject which is full of research opportunity and one that will no doubt tend to throw more light upon the clinical phenomena of infection. I know that the subject is one to which Dr. Riesman has given a great deal of attention, for he has mentioned it to me on several occasions during the past two or three years.

I should like to draw attention to the analogy between anaphylaxis, or allergy, and the subject of infection, especially in view of the hypothesis expressed by Dr. Riesman. Dr. Vaughan has taken rather an extreme view of the subject of infection and ascribes the symptoms and changes to the action of protein cleavage products. He believes that in an infection when the micro-parasite enters the tissues no symptoms are produced until this parasite has stimulated the production of an antibody which then acts upon the parasites, breaks up the protein molecule and liberates a non-specific toxic portion responsible for the symptoms of the disease. According to this investigator the particular symptoms of a disease are not dependent upon a peculiar or specific toxic product, but upon the location of this non-specific protein poison, *e. g.*, the symptoms of pneumonia are due to the fact that the pneumococcus is located in the lung,—typhoid fever, to the fact that the bacillus is in the lymphoid tissues, etc. He supports his hypothesis by experimental evidence. He believes that he is able to produce this protein poison by cleaving the protein with an alkali dissolved in alcohol. Friedberger has also advanced ideas in the same direction, believing that the bacterial protein is split in the living tissues by an antibody and complement thus liberating the protein poison responsible for the symptoms of that disease. Vaughan has studied the subject experimentally in the test-tube; Friedberger in experimental animals and von Pirquet at the bedside; but, it is not at all possible at the present time to subscribe entirely to these views. It is not possible to exclude the action of the bacterial toxins themselves, as so well expressed by Dr. Riesman this evening. Bacteria, we know, are in general of a protein structure. There is no reason why, after a foreign bacterial protein has entered the body, we should not expect the production of proteolytic (bacteriolytic) antibody. It is perfectly true, then, that as the antibody is produced the protein will be split with the liberation of toxic cleavage products. The splitting of a protein molecule may

liberate a protein poison, but to ascribe all symptoms of infection to this one toxic product is claiming a great deal. It is rather a combined action of bacterial toxin and of the protein poison.

The point emphasized by Dr. Riesman that the new cells produced as a result of bacterial infection may contribute a toxic substance or substances tending to produce symptoms, is to my mind very well taken, and shows the close analogy between the process of anaphylaxis and infection. We know that the introduction of sterile horse serum into an animal will lead to the production of a proteolytic antibody capable of digesting the serum protein and producing a proteotoxin responsible for the symptoms. We know from the researches of Abderhalden that the entrance of syncytial cells or their products into the maternal circulation will produce a ferment capable of splitting the protein of these cells. While recent work would seem to show that this ferment is not specific, no one will deny that it is produced. In bacterial infections it is probable that antibodies may split the bacterial protein and liberate a protein poison capable of producing symptoms which will add to the clinical picture of that disease. Likewise it may be that the cells of a new bacterial tissue, as the enormous numbers of new cells formed in typhoid fever and tuberculosis, may act as a foreign protein, calling forth the production of antibodies capable of causing the digestion of their substrate *in vivo* and liberating a protein toxic product of importance in the etiology and symptomatology of an infection. In this manner the processes of anaphylaxis and infection are closely related, and from this standpoint Dr. Riesman's paper is of much interest and importance aside from drawing attention to the probable role of toxic products which may be produced by these new cells and analogous to the toxins of bacteria.

PROCEEDINGS

OF THE

SECTION ON OPHTHALMOLOGY

JANUARY TO NOVEMBER, 1914

JANUARY 15

Remarks on the History of Ophthalmology in Philadelphia and Europe[1]

Dr. George Strawbridge spoke as follows: In 1866 I graduated from the Medical Department of the University of Pennsylvania, Dr. Joseph Carson, Professor of Materia Medica, being my preceptor. After spending ten months as interne in the Episcopal Hospital, I concluded to thoroughly study the eye and ear, and later to make these my particular line of practice in Philadelphia.

Before sailing for Europe, I called upon my preceptor to bid him "Goodbye," and, upon asking his opinion of my plans, he promptly replied, "A fool and his money are soon parted." With this encouragement, I sailed the next day from New York on the Cunard steamer "Persia," one of the two remaining side-wheelers of the fleet. The passage occupied eleven days to Queenstown, where an extra supply of coal was secured to carry us up to Liverpool, making two thousand tons for the entire trip. It was a favorite amusement for the passengers to look down the

[1] These notes were made by Dr. Strawbridge of an informal talk given by him at a meeting of the Section of Ophthalmology of the College of Physicians, and it was his intention to revise and amplify them in a paper for the Transactions of the Section. Unfortunately before he could carry out his plan, he was stricken with pneumonia and died, June 28, 1914, in his seventieth year.

sky-light from the main deck into the kitchen, or galley, to see the cooks preparing the meals. All the meats were fried in one pan—chickens, ducks, mutton, beef, etc., so naturally they tasted much alike. The passengers generally supposed this was due to the effect of the sea voyage upon their digestive functions.

On landing I journeyed direct to Vienna, at that time the home of the most famous medical school in the world, and secured quarters convenient to the General Hospital. One landlady amused me very much by showing me a small room with a very narrow single bed, and said "two gentlemen occupy this room and bed, but not at the same time. One works all day and sleeps at night, while the other dances all night and sleeps in the day-time, so the bed is always in use."

The eye clinics were in charge of Professors Arlt, Jaeger, and Stellwag, the clinic of the last named being attended principally by the army and navy medical students. Dr. William F. Norris, of Philadelphia, was in Vienna at this time.

Dr. Jaeger was a very lovable man. He devoted his time exclusively to the clinic, and did no office practice. Drs. Mauthner and Schnabel were his assistants. In operating, the patient sat in a chair while Dr. Jaeger was seated in front. He used a Beer's knife and did a simple extraction. All of the operators were ambidextrous. In general the cataract extractions resulted in from 5 to 10 per cent. of loss. Dr. Jaeger's demonstrations to the students were made on pigs' eyes and upon the severed heads of cadavers. Sometimes six or seven heads were brought in at the same time, as material was plentiful.

Dr. Jaeger had a fine ophthalmoscopic class. He used his own ophthalmoscope, a modified Helmholtz instrument with two mirrors, one composed of three thin plates of glass and the other silvered. The one with the glass plates had the advantage of not causing much pupillary contraction, owing to the limited amount of light reflected, but it was more difficult to use. He was at work at that time on the atlas of the fundus, all the drawings of which he made with painstaking care. The retinitis pigmentosa plate was the work of days, each pigment spot being accurately sketched.

In comparison, Liebreich's atlas was a rough affair. Very little was done with refraction.

The two clinics and private cases occupied about five hours a day, leaving time for a private course in pathology in the Rokitansky laboratory. Occasionally a visit was made to other clinics, such as Hebra's skin clinic and the Skoda medical clinic, the latter famous for teaching auscultation of the heart and lungs. Diagnosis and prognosis seemed to be the important consideration, as little attention was given to the treatment. On one occasion at the Skoda clinic, after following the professor around the ward, I asked the first assistant why nothing of any moment was said as to the treatment. He looked at me, and in a sad way shrugged his shoulders.

In the Arlt clinic the assistants were Drs. Rice and Otto Becker, the latter afterward going to Heidelberg to fill the chair of ophthalmology which became vacant when Dr. Herman Knapp went to New York. Dr. Arlt gave a fine operative course on the eye, using pigs' eyes and the cadaver for the students' practice, while Dr. Becker gave an excellent ophthalmoscopic and refraction course. About ten students attended each class, the fees being from fifteen to twenty dollars.

Operations in which the eyeball was opened, such as cataract and iridectomy, were performed while the patients reclined on their respective beds, so as to obviate removal afterward. The professor was a good operator. After a year in Vienna I went to Berlin to study under von Graefe. I carried a letter of introduction to him, as he was difficult to meet. Dr. Weightman accompanied me. Von Graefe was made professor in the medical school after great opposition by the faculty. He had his own private hospital of one hundred beds. The place was overrun by students, and, although there was not much of asepsis, he had good results. There was no sign on the house. His office hours were from 8 to 10 in the morning, three days a week. The nobility were admitted first, and then came those who paid the servant the largest fee.

He had for his assistant Dr. Waldow, a somewhat flashily-dressed man, who was paid a good salary to assist in the opera-

tions three times a week. Waldow actually did very little assisting, but von Graefe always desired his presence, and on one occasion refused to go on with his operation until Waldow came.

Von Graefe gave no private courses. On several occasions he refused to accept decorations until persuaded by Waldow. Waldow allowed me to do a number of small operations. The incision for cataract extraction at that time was linear, made well into the sclera, but von Graefe gradually came to make the cut more forward, as considerable vitreous was lost in many cases. He had the habit of sucking the spoon in removing lens remnants.

The employment of iridectomy for the relief of glaucoma was an accidental discovery during an operation for artificial pupil in leucoma. He found a lessened tension, and decided to try the operation for glaucoma. Von Graefe died from pulmonary hemorrhage at forty-four.

I saw the work of Donders and Snellen at Utrecht, and had the pleasure of working under von Helmholtz in Heidelberg. Von Helmholtz was known at that time as a great physicist, and had a wonderful mind and method of procedure. He had a very simple laboratory. Students were at work on various problems; one was experimenting with ear-drums and another with muscles. When asked where they kept the instruments, he said they knocked together what they wanted at the time and did not preserve them. Von Helmholtz came to the laboratory at eight in the morning, and gave advice to his workers, who were at liberty to consult him until noon.

After three years abroad, part of which time was spent in London, I returned to Philadelphia and visited the Wills Hospital, where eight general surgeons were in charge.

The Philadelphia Dispensary was conducted by Dr. Tom Wistar. We asked permission to establish a dispensary on Seventh Street below Spruce under their charter, and this request was granted. The first year we had 700 patients, while the Wills Hospital, which had been in operation thirty years, had but 300. A committee from the hospital called to see what was the attraction, but only succeeded in interviewing the janitor. Shortly

afterward the entire Wills Hospital staff was discharged and ten new men were appointed. Sometime later I was appointed surgeon to the hospital. At first the Wills Hospital had no out-patient department. The University at that time was much opposed to specialism. Dr. Agnew was taken unwillingly as demonstrator of anatomy, and he then managed to have many specialists appointed to the staff. I was the aurist.

America always led in refraction, which was largely due to the influence of Dr. William Thomson, who encouraged careful work. Dr. Dyer came to Philadelphia from Boston, and soon had a large practice. He was the first here to use atropin for refraction. He afterward went to Pittsburgh.

Dr. S. D. Risley thanked Dr. Strawbridge for his interesting and most entertaining narrative of his European experiences as a student. He had been particularly interested in the vivid sketches of the personality of the men who in some sense were the nestors of modern ophthalmology. Dr. Risley regretted that more had not been said about the group of men whom Dr. Strawbridge on his return had found engaged in special practice in the United States. The American Ophthalmological Society had been founded in 1864, and held annual meetings. It was comprised of a group of men all, or most, of whom had become acquainted during foreign travel and study. These annual meetings for the presentation and discussion of papers became notable occasions for social intercourse and for cementing enduring friendships until they became a band of brethren, zealous after professional renown and exemplars of the best professional ideals.

The second annual meeting was held in New York, June 13, 1865, with Dr. Edward Delafield as president. There were twenty members present. It was at this meeting that Dr. Dyer presented his noteworthy paper on "Asthenopia not Connected with Hypermetropia," in which was recommended graduated "gymnastic" exercise with the eyes which later became known as "Dyerism." The patient was directed to use the eyes for three to five minutes, followed by complete rest, the time to be gradually increased two or three minutes daily.

The *Transactions* of this society setting forth the scientific work of its gradually increasing but rigidly selected membership afford an excellent opportunity to study the advancing tide of ophthalmology, and will repay even now a careful reading. It is of great interest to scan the list of names of the Philadelphians present at the annually recurring meetings. New names appear and many of them will be recognized as our friends and teachers. In 1865 the names of E. Dyer and T. G. Morton appear. In 1869 A. D. Hall and William Hunt; in 1870 William F. Norris and William Thompson; in 1871 George Strawbridge. Later George C. Harlan, followed by a steadily increasing group of men, not only from Philadelphia, but from all sections of the country.

We are fortunate, American ophthalmology is fortunate, in having had at the outset such a group of notable men to inaugurate the era of specialism in medicine. In Philadelphia at that time the tendency was to regard the specialist as a charlatan. But when a group of college-bred men, graduates of our best medical schools; after a year or more spent in continental clinics, deliberately chose to devote their practice to a special branch of medicine, none were strong enough to successfully ignore or condemn. As ophthalmologists we owe them a debt of gratitude. Many reminiscences of personal contact and experience with them come to mind. The year of graduation found me with my first eye case—diagnosed as iritis—consultation with my old teacher Dr. D. Hayes Agnew, then a surgeon at Wills Hospital, proved it to be phlyctenular ophthalmia. The rapid cure which followed the new treatment he advised taught me that I had much to learn about diseases of the eye, and sent me to the Wills Hospital for study. My obvious eagerness to learn led Dr. Harlan to ask me to join his service. In this way Dr. Harlan became my first teacher in ophthalmology. He advised me to read Donder's *Anomalies of Refraction and Accommodation.* At the close of his three months' service I remained with his successor, Dr. William Thompson, and three months later with Dr. Douglas Hall. At the close of his term Dr. William F. Norris, but recently elected clinical professor of ophthalmology at the University,

then situated on Ninth Street, requested me to join him in his work as assistant, which proved the beginning of a life-long association of friendship and work. These years are replete with incidents illustrative of the life and work of those men who were our teachers and friends; illustrative also if compared with present methods, of the great and rapid advance in ophthalmology. I regret only that Dr. Strawbridge did not tell us more from his rich and extended experience of the men with whom he was so intimately associated.

Albuminuric Retinitis Subsequent to Decapsulation of the Kidneys

Dr. J. Hiland Dewey showed a man, aged nineteen years, in whom decapsulation of the kidneys was later followed by albuminuric retinitis. In May, 1912, the patient was referred with a history of nephritis and marked general edema, a decapsulation of the kidneys being under consideration, a report on the eye-grounds was desired. Both eye-grounds were found normal and the vision in each eye was 5/5.

In July, 1912, he was admitted to the medical wards of the University Hospital, where rest and medication for five months failed to improve his condition. In January, a few days before the kidneys were decapsulated by Dr. Charles H. Frazier, the pupils were equal and reacted to light and convergence, both disks were hazy in outline and presented the appearance of a low-grade neuritis. There were no exudates or hemorrhages.

The following August marked blurring of vision was noted, and the retina was filled with large white placques and numerous hemorrhages. The disk was swollen three D., the edema extended some distance into the surrounding retina, and the characteristic changes appeared at the macula. Vision: R. E. = 3/100; L. E. = 5/50.

There was severe headache for three months; when it subsided the vision was found to be improved. By January, 1914,

many of the white placques had been absorbed and no hemorrhages remained, but the neuritis had not subsided. Vision: R. E. = 5/50; L. E. = 5/12. It was evident that this grave complication is not to be avoided by operation.

In view of the improvement in both subjective and objective symptoms, can it not be tentatively assumed that there is a possibility that in patients who have been subjected to decapsulation, the disease is so favorably influenced by the operation that the retinal picture has not the same prognostic significance as in cases otherwise handled.

Dr. Zentmayer: As Dr. Dewey has said, it is of considerable interest to note whether decapsulation has any effect upon the ocular complications of nephritis. Whether they tend to precipitate or to prevent such symptoms or whether they favorably or unfavorably influence their course. For this reason I should like to cite a case in question: S. M., aged forty-seven years, single, was seen by me in May, 1910. She had been wearing glasses twenty-seven years for the correction of a compound myopic astigmatism. The defect in the left eye has always been the higher. She had been under treatment for three years for chronic interstitial nephritis. Two years before my seeing her she had had the right kidney decapsulated, with the hope of relieving severe right lumbar pain. Through the courtesy of Dr. de Schweinitz I am able to state that repeated examination made over a period of several years previous to the operation showed no gross ophthalmoscopic changes or opacities in the lenses. Soon after the operation vision began to fail in the left eye and an examination made about one year later showed opacities in both eyes but much more pronounced in L. E. My examination in May, 1910, showed spiculæ extending into the pupillary space from all sides, with diffuse nuclear granulation. In R. E. the nucleus was outlined, and there were faint opaque lines in the periphery.

There has been but little change in the last three years. The myopia and the astigmatisms have increased in L. E. There is still a trace of albumin and also a few hyalin casts.

Multiple Tubercles of the Iris

Dr. S. Lewis Ziegler exhibited a case of multiple tubercles of the iris. The patient, a colored girl, aged twelve years, was first seen at Wills Hospital in December, 1913. The right eye had been inflamed for three weeks, and upon examination showed a hazy cornea, cloudy, aqueous, and muddy iris, on which there were three yellowish-red nodules at the periphery down and in. The pupil, which was contracted and immobile, dilated irregularly under atropin. The patient was given $\frac{1}{250}$ mg. of Koch's Old Tuberculin and a tonic mixture. She was so ill following the injection that she was unable to report at clinic for two weeks. The nodules on the iris had increased to ten and surrounded the entire periphery. The family history was negative.

Contusion of the Globe with Penetration of the Orbit by a BB Shot

Dr. T. B. Holloway exhibited J. Q., aged fourteen, who was first seen on December 27, 1913, a few hours after he had been struck in the right eye by a BB shot discharged from an air rifle, at a distance of about twenty feet. Upon his admission to the University Hospital the resident had noted a wound in the conjunctiva over the internal rectus. When seen by me an hour or so later the boy complained of pain, and stated that his vision was much impaired. There was a moderate injection of the bulbar conjunctival vessels and over the internal rectus there was a distinct area of chemosis and a small subconjunctival hemorrhage, but no evidences of a perforation of the globe. The pupil was quite well dilated as the result of atropin. There was a small streak of blood on the anterior capsule of the lens, and slight evidences of hemorrhage on the nasal side of the iris. The patient could recognize hand movements at a distance of about a meter. The globe was slightly proptosed, and there was distinct

limitation of inward rotation. There was no reduction in tension. The vitreous showed a dense diffuse haze but through this one could see the slightest suggestion of the retinal vessels and several hemorrhagic areas near the disk and in the nasal field. There were no fundus changes in the left eye.

During the next six days the vision improved and the vitreous became clearer. There was a partial absorption of the hemorrhages in the fundus and throughout the posterior pole of the eye, and especially throughout the nasal portion of the fundus were noted vague retinochoroidal changes with the formation of a pigment mosaic. Situated as far forward as one could see in the upper nasal quadrant was a large hemorrhagic extravasation adjacent to an area giving a distinctly whitish reflex. The disk was rather pale, soft and mellow; the retinal veins much engorged and dilated. By January 10 the proptosis had practically subsided and there was complete return in the power of the internal rectus. With a −1.00 S. the vision was 6/22. Tension was minus. During his stay in the hospital, Dr. Pancoast made a number of *x*-ray plates, and located the bullet at the inner portion of the sphenoidal fissure.

This case has been shown because it seems to be a rather unusual injury. The shot evidently struck the globe about the position of the internal rectus, perforated the conjunctiva, and ploughed its way between the globe and the nasal wall of the orbit, to lodge at its final resting place the inner end of the sphenoidal fissure.

FEBRUARY 19

Tubercular Keratitis

Dr. Hansell exhibited four patients from the Philadelphia General Hospital affected with grave forms of mixed superficial and deep keratitis. In three the von Pirquet test for tuberculosis was strongly positive, in the fourth negative.

Case I.—Colored girl, aged nine years. No skin reaction to tuberculin. The glands of the neck and peribronchial glands were swollen; healed tubercular processes in the apices of the lungs; old chronic pleurisy of left side. The right cornea was opaque, yellowish red, deeply infiltrated and vascularized. The anterior chamber seemed to be absorbed or occluded by inflammatory exudation which united the iris to the cornea. The left cornea contained numerous round areas of deep infiltration, partly isolated, partly confluent. Notwithstanding the negative reaction the affection of the eyes must be considered tubercular.

Case II.—Girl, aged eighteen years, half Indian, half negro. Positive v. Pirquet reaction. Right cervical glands were removed in childhood; left glands were enlarged; large area of consolidation in left apex and a small one in right; night sweats. Left eye was removed some months ago on account of corneal disease (in another hospital). Right eye showed isolated round points of deep infiltration, involving the major part of the cornea.

Case III.—Woman, aged twenty-nine years. Positive v. Pirquet reaction. There were chronic fibroid processes in both apices anteriorly and posteriorly; cervical glands enlarged; cough for four months; night sweats for a year. The right cornea was infiltrated similar to Cases I and II. Left, a branching fine superficial infiltration without vascularity.

Case IV.—Colored girl, aged eleven years. Positive skin reaction. Enormous enlargement of cervical, maxillary, sublingual, and bronchial glands. Healed lesions in apices, round and irregular patches of corneal infiltration, intense photophobia and lacrymation.

Ectropion of the Eyelids Corrected by Grafts

Dr. Leighton F. Appleman reported a case of ectropion of both eyelids of each eye resulting from a burn received in a mine explosion, with photographs. The upper lids were everted until there was scarcely 3 mm. of healthy skin between their edges

and the eyebrow. The right cornea was densely opaque and the sight was lost; the left cornea was not involved.

Correction was accomplished in two operations. In the first, both upper lids were freed by cutting through the cicatricial tissue, drawing them down and anchoring them to the cheek by three double threads passed through their edges and the ends tied over small cylinders of iodoform gauze on the cheek. The denuded surfaces, each about 35 mm. by 25 mm. in extent, were then covered by skin grafts taken from the arm.

Oiled gutta-percha tissue was applied with slight pressure. After the second day, when the dressing was first changed, the lids were dressed with 1 to 10,000 bichloride compresses. Some suppuration occurred, but the wound healed smoothly.

The second operation, on both lower lids, was done after the upper ones had healed completely. The same procedure was followed, except that the edges were anchored to the upper lid by three sutures, and that oiled gutta-percha dressings were continued for five days. Healing occurred without suppuration, which Dr. Appleman attributed to the avoidance of wet dressings.

After healing, the lower lids were not in as perfect apposition to the globe as desired.

Discussing Dr. Appleman's paper, Dr. de Schweinitz said that he had found a dressing, originally suggested, he thought, by Dr. Keen, very useful after the application of skin grafts, namely, surrounding the graft with a series of strips of gauze of sufficient height to place the graft, as it were, at the bottom of a shallow well, over which an ordinary gauze dressing was laid, which then did not come in contact with the graft, but which was kept continually moist with a warm physiologic salt solution. He had also sometimes maintained artificial heat by permitting the patient to keep his head in contact with a bottle containing hot water.

Dr. Posey recalled a case of double and complete ectropion of all the lids, following a severe burn. The patient, a teamster, had received the injury some twenty years previously and notwithstanding the exposure to which the cornea had been sub-

jected, in consequence of the lack of protection of the lids, and the man's occupation, both membranes were quite clear and vision normal. Dr. Posey had followed much the same steps as those mentioned by Dr. Appleman, but had operated upon the four lids at the same time. The upper grafts took well but the lower sloughed, doubtless in consequence of a rather profuse conjunctival discharge.

Dr. Posey said that he did not use protective in his flap or grafting operations, unless Thiersch grafts were employed, but covered the wound with gauze moistened in bichloride salve in the strength of 1 to 3000, prepared after the formula of White. He thought the pressure of the dressing of decided advantage in immobilizing the lids.

In closing the discussion, Dr. Appleman stated that he was gratified at the final result in the upper lid and at the prompt healing of the lower lids without suppuration, in contrast to the amount which followed in the upper lids, although the latter finally healed very smoothly. His only regret was that he had not anchored the lower lid to the eyebrow, instead of to the edge of the upper lid, as this would have increased the denuded area and the increased width of the grafts would more completely compensate for subsequent shrinkage.

Pseudoglioma Following Traumatism

Dr. Frederick Krauss reported a case of psuedoglioma directly due to traumatism. It occurred in a five-year-old child, who accidently ran an iron meat skewer into the left eye directly behind the ciliary body on the nasal side. *X*-ray plates were negative. The wound was sutured. The hemorrhage absorbed from the anterior chamber, but recurred frequently into the vitreous. Three months later there was marked contraction at site of the scar with a yellow reflex filling the pupillary space directly behind the lens and presenting the appearance of a tumor. The tension was very low. The entire process progressed without

inflammatory phenomena beyond a slight tenderness. The other eye was normal.

Dr. Krauss called attention to a lessened development of the orbit and facial asymmetry which he believed was consecutive to removal of the eyeball in very young children. He sought an expression of opinion from the Fellows present.

Dr. Heed reviewed the history of a child, eleven years of age, who presented the apparent deformity of a retracted orbit with marked facial asymmetry due to a phthisis bulbi of six years duration. He believed this case would illustrate the fallacy that early enucleation is responsible for such deformity.

Dr. Posey advised enucleation of the globe on account of the danger of sympathetic trouble and recommended the insertion of some kind of a globe into Ténon's capsule.

Dr. Zentmayer said he was quite in accord with the advice that the eye be removed. He did not think the fact, if it were a fact, that the orbit might not fully develop should weigh in arriving at a decision where an eye was so badly disorganized, especially in a child. As to the question of the failure of the orbit to develop when the eyeball is removed in early childhood, while it might have this appearance, it did not seem to be borne out by measurements. Some fifteen years ago an English clinician measured the diameters of the orbit in a series of adults in whom the eyeball had been enucleated in childhood and found them to correspond to those in the normal adult.

Dr. B. Alex. Randall said that in one case where the loss of an eye in infancy had left a stump as after enucleation, since the remains of the globe were not larger than a pea, his careful measurements in the nearly grown patient had shown no slightest difference in the size of the two orbits or facial confirmation.

In closing Dr. Krauss said he remembered reading the paper cited by Dr. Zentmayer, but was strongly impressed by the personal observation of facial asymmetry in several cases in which he had removed an eyeball in the early youth of the patient, and, therefore, had hesitated in enucleating this eye in the absence of inflammatory symptoms in either eye.

Unilateral Optic Atrophy Due to Pituitary Disease

Dr. Frederick Krauss presented a case of unilateral optic atrophy due to pituitary disease.

The *x*-ray plates showed an enlarged sella turcica, the diameter of which was 2 cm. anteroposteriorly and 2 cm. vertically. There was marked atrophy of the left optic nerve with a unilateral temporal hemianopic field, the densest scotoma being to the temporal side near fixation.

The right nerve was unaffected, the fields being normal. Recently there has been slight cutting of the red field. There was also nerve deafness on the left side which was recent. The general symptoms were sleepiness and sexual apathy in moderate degree. Treatment was ineffective.

Discussing Dr. Krauss's paper, Dr. de Schweinitz described his own and Dr. Holloway's investigation of the visual field phenomena produced by disease of the pituitary body, and referred to the frequency of notable alterations in the extent of the visual field, depending upon alterations in the pressure-producing tumor, alterations which might occur within a few hours of each other, that is, the field having a different extent at one portion of the day than it had at another. He made reference to those forms of visual field which were not so-called typical ones; the frequent absence in pituitary body disease of bitemporal hemianopsia, the presence of various types of homonymous hemianopsia, and the presence of scotomas, especially paracentral scotomas, and he referred at some length to a phenomenon which he had discussed on other occasions, namely, a period of central amblyopia without fundus change, which might, for a definite period, antedate actual changes in the visual field itself, to which phenomenon others, for example, Parsons had also called attention.

In closing Dr. Krauss expressed his gratification at the splendid result following the administration of thyroid gland extract in Dr. de Schweintz's patient and would suggest its use in this case to the family physician.

Some Remarks on Ocular Decompression

Dr. G. E. de Schweinitz, after a comparison between operations which are performed for the release of intracranial tension and the relief of intraocular tension, discussed particularly his experience with corneoscleral trephining (Elliot's operation) in the treatment of glaucoma, and illustrated his paper with a number of case histories of patients, who were submitted to this operation, suffering from absolute glaucoma secondary to intra-ocular hemorrhage; postoperative glaucoma, that is, glaucoma after extraction of cataract; glaucoma secondary to cataract, that is, in association with the swelling of a cataractous lens; acute glaucoma; ordinary chronic glaucoma; chronic glaucoma with exacerbations, sometimes called subacute glaucoma or chronic congestive glaucoma; corneal lesions with glaucoma, for example, staphyloma; and absolute glaucoma, that is, the end stage of either a recurring congestive glaucoma, or an acute glaucoma.

As the result of his experience with this operation, he concluded that he was unconvinced that corneoscleral trephining was a better operation in acute primary glaucoma than a technically correct iridectomy; that he was convinced that it was a better operation in ordinary chronic, so-called non-inflammatory glaucoma than the usual iridectomy, and that in this disease one or other of the methods of producing a filtering area should be employed in place of simple iridectomy; that in the event of the failure of iridectomy to check a glaucomatous process it was a better operative procedure than a second iridectomy or an ordinary sclerotomy; that in chronic glaucoma with greatly contracted visual field it appeared to be a safer procedure than ordinary iridectomy; that it was not a wise operative procedure if glaucoma was complicated with cataract, as Col. Elliot had pointed out; that it was a procedure which should be thought of, for the relief of glaucoma secondary to cataract extraction if in the affected eye it could be demonstrated that the vitreous and the aqueous chambers were not in communication, as Colonel Elliot has also pointed out; that it was a perfectly proper pro-

cedure to try in absolute glaucoma, and could be repeated in the hope of preventing enucleation, although it could not be promised that this prevention was assured; that it did not seem to be an operation that was likely to meet with success in the relief of increased intra-ocular tension due to intra-ocular hemorrhage; that it might be tried in staphyloma and secondary glaucoma, but that the outlook was not a brilliant one.

Dr. de Schweinitz said that he had not encountered late purulent infections, such as had been a number of times reported, in his own practice, although he had seen one in a hospital service, not under his own care. He had encountered two types of iritis, one appearing early after operative interference in the form of the so-called quiet iritis, and the other occurring usually at a somewhat later period and manifesting itself with the ordinary phenomena of plastic iritis. It had seemed to him that this plastic iritis was more apt to occur in patients who might from their constitutional condition be subject to various types of autotoxemic uveitis and iridocyclitis. He had closely followed Colonel Elliot's recommendation that the so-called quiet iritis should be guarded against by the early use of mydriatics, in his experience scopolamin or homatropin being the preferable drug to use.

He concluded that if the whole story of glaucoma was increased intra-ocular tension, this operation, or any other successful operation which induced permanent filtration would approach close to solving the problem of the treatment of glaucoma, but he did not believe that increased intra-ocular tension was the sum and substance of this difficult and complex disease, and he was thoroughly convinced that in its treatment, in addition to operative procedures, the very best line of therapeutics suggested by elaborate studies of metabolism, and if necessary, with the aid of an expert internist, was required.

Dr. Zentmayer: I had rather that the Chairman had not called upon me as I feel that my experience with the operation has been so slight that it should not be considered of much value as compared with Dr. de Schweinitz's experience in almost all types of glaucoma. I might express myself here as I did recently

in a letter to a colleague who asked me what I thought of trephining. I said that I did not think any single operation would fulfill the requirements in a disease with so varied a pathogenesis as glaucoma. I am not sure that an operation so purely mechanical as making a hole in the eyeball was altogether a rational procedure, as in a large number of cases the hole will be closed by connective tissue or perhaps uveal tissue. Since iridectomy had been added to prevent the latter complication it was difficult not to feel that some of the success of the operation was due to the latter procedure alone. As to the ultimate value of the operation in simple glaucoma it was still too early to judge as this disease is essentially a chronic one. I have no doubt but that iridectomy was considered of great value at the same stage of its history as that which trephining has reached.

In this connection Dr. Zentmayer gave the notes of the case exhibited of an untoward result following trephining. The patient had been under his care for six years. He is now fifty-seven years of age. It was a case of simple glaucoma with high intra-ocular tension. For the first eighteen months of myotic treatment he had more than held his own in visual acuity, visual field and T. After that he was not seen for four years, but according to his statement and that of his physician, at whose drug store he obtained the myotic, he had used it regularly all this period. In January of this year he returned, stating that the vision was gradually failing and that he had had attacks of foggy vision. V. in R. E. 6/7; L. E. 6/40. Field in L. E. greatly contracted on nasal side. T. of both eyes 55 mm. After one week's systematic use of eserine, which succeeded in reducing the T. about 5 mm., the L. E. was trephined. The iris prolapsed and was cut off. No complications. At the end of twenty-four hours the anterior chamber was reëstablished but twenty-four hours later it was again empty, and there was a leaf-shaped subcapsular opacity in the lens in the pupillary area. At the time of the first examination a few fine spiculæ had been noted in the lower inner sector of the lens and these had not increased in four years. V. two weeks after the operation, 3/40; field unchanged; T. = 22 mm.

While the development of cataract was known to occur after iridectomy for glaucoma without direct injury to the lens, he believed it more likely to follow trephining as it seemed to him that the release of intra-ocular T. was more sudden during this operation than any of the others employed in the treatment of glaucoma.

Dr. S. D. Risley, after an expression of his personal indebtedness to Dr. de Schweinitz for the admirable analysis he had given of his operative experiences in the various phases of increased tension of the eyeball, said that he had been particularly pleased with the conclusion which had been reached from these experiences and so tersely stated in the phrase that increased tension was not the complete picture of glaucoma. In a paper "An Inquiry Regarding Increased Tension of the Eyeball," to which such complimentary allusion had been made by Dr. de Schweinitz, Dr. Risley said his design had been to set forth the clinical fact that the intra-ocular conditions culminating in increased tension of the ball were simply a local expression of some general disorder. In support of this view he found corroboration in the fact that primary glaucoma rarely or never occurred in otherwise healthy individuals. In the first place primary glaucoma was a disease rarely occurring before middle life; in other words, it came at a time when the physiological processes became impaired through the wear and tear, misfortunes and excesses, incident to human life. In a majority of cases careful study revealed the more or less advanced ravages of organic disease as manifested by high blood-pressure, commencing cardiovascular disease, urine with high specific gravity, and other evidences of impaired metabolism. The uveal tract of the eye participating in the general pathological state of the organism gave rise to the phenomena characterized as glaucoma. Briefly stated the local or ocular condition was one of uveal disease; characterized by faulty nutrition of the eyeball, impaired filtration, due either to the change in the character of the excreted fluids or to disease of the filtering tissues and therefore increased tension of the ball. Increased tension of the eyeball was peculiar only because of peculiar anatomical condition

presented in the eye. These ocular conditions, excepting only the anatomical peculiarities, found abundant analogy in other organs of the body; *i. e.*, the intracranial edema and headache of uremia; the inflamed, swollen and painful joints in rheumatism and certain other infections and the affections of the middle ear and the other bony sinuses of the skull lined with mucous membranes.

These conditions were all associated in all probability with an acidosis of the tissues or a toxemia, and were analogous to the condition preceding and leading up to increased tension of the eyeball. They were all certainly benefited by the same measures adopted for their relief: a carefully regulated diet, attention to the alimentary tract, and by the internal administration of alkalies. If this view was correct then the surgical procedures for the relief of tension, whether the well-established iridectomy or the newer forms of operation, were to be regarded as necessary but temporary expedients for immediate relief. By this means threatened blindness from the increase of tension could be warded off until sufficient time could be had for the removal by treatment of the general etiologic factors.

Dr. Posey said he was particularly interested in the good results Dr. de Schweinitz had described following the operation in what might be designated desperate cases of chronic glaucoma, *i. e.*, those in which the field was cut almost to fixation. In his private practice he had had most satisfactory, indeed remarkable, results follow the prolonged and continued use of myotics in this class of cases and had seen the small field conserved for many years. He mentioned the case of a woman with poor vision in whom sight had been conserved for a number of years with myotics, who had passed from under his care and had been rendered entirely blind by an Elliot operation. In his hospital work, where it was impossible to rely upon the myotic form of treatment being properly carried out, he had employed Heine's operation to correct this class of cases, and with good results. He had never been able to follow any of his hospital cases long after the

operation. He agreed with Dr. de Schweinitz, that it was unwise to trephine eyes in which the lenses contained opacities, for fear of the complication of which Dr. Zentmayer had spoken. This limited the field of the operation considerably, as so many cases of chronic glaucoma have lenticular haze.

In closing the discussion on his paper, Dr. de Schweinitz said that he did not desire to be understood that he was making an advocacy of corneoscleral trephining to the exclusion of other operations by means of which permanent filtration could be secured. Colonel Elliot's brilliant results and the results of others who had followed him gave all the information necessary on this subject. His own experience had been too limited to make *ex cathedra* statements. He had had admirable results, some of which he had reported; he had had failures, some of which he had also reported. It seemed to him, as far as he had gone, and his earlier operations had been performed three years ago, that in chronic glaucoma he had secured better results with this operation than he had with others, although his operative experience was not large enough for him to make a comparison between the results of corneoscleral trephining and those, for example, which were secured by means of Lagrange's operation, with which operation he also had achieved satisfactory continuous decrease of intra-ocular tension and the relief of glaucomatous symptoms. He was satisfied that the ordinary iridectomy in chronic glaucoma was not an operation which offered the patient the surest hope of recovery. He agreed with Dr. Posey that many patients with chronic glaucoma could be kept in a comfortable and satisfactory visual condition by a technically correct use of myotics, but he thought that, other things being equal, the risks of a myotic life were greater than those of operative procedures, especially if they could be early performed. He realized that no hard-and-fast rule could be formulated. Necessarily many exceptions occurred, and each glaucoma patient must be studied from all stand-points.

MARCH 19

A Case of Tuberculosis of the Conjunctiva

Dr. William T. Shoemaker read a paper upon "Tuberculosis of the Conjunctiva," reporting a case which had been shown before the Section at a previous meeting.

The case was that of a male, aged twenty-nine years, who had been operated upon for appendix abscess. The wound did not heal and a fecal fistula resulted. A second operation included the resection of six inches of the ileum, the serosa of which was studded with small white tubercles. The eye condition about this time was as follows:

Left palpebral fissure narrowed, conjunctiva of upper lid and fornix thickened and covered with small shallow ulcers and yellowish infiltrates. Ulcers were sluggish and had irregular margins. Bulbar conjunctiva and that of lower lid were thickened and injected, but otherwise negative. The pre-auricular gland on the left side was enlarged, and there was a large perforation of the nasal septum. Vision, 6/7½. Fundus examination negative. Scrapings from lesions in the upper lid were reported free from tubercle bacilli.

A small piece cut from conjunctiva of the upper lid was rubbed up in normal salt solution and injected into the anterior chamber of a rabbit's eye. Tubercles started to develop in the rabbit's eye fourteen days later. The eye was removed twenty-one days after inoculation, and showed, macroscopically, the characteristic signs of tubercle iritis. Microscopic examination was unsatisfactory.

The case was treated for a long time with Koch's old tuberculin. Marked improvement was noted in the patients abdominal lesions, but little change took place in the conjunctival lesions.

Dr. Shoemaker regarded the conjunctival tuberculosis as of ectogenous origin, due in all probability to the direct transference of tubercle bacilli to the conjunctival sac, by the patient himself.

Tower Skull

Dr. T. B. Holloway reported the history of a patient with tower skull who was admitted to the Pennsylvania Institution for the Instruction of the Blind in the fall of 1913. It was noted that his eyes were not normal "very soon" after birth, He was bright and intelligent, and never had convulsions. The father is said to have had specific disease, but the patient's blood gave a negative Wassermann reaction. The patient's head and face showed the characteristics so frequently found in this condition. There was bilateral exophthalmos and divergent squint. Each disk showed an advanced consecutive atrophy. With the right eye he could count fingers at fifteen inches; with the left he could only perceive shadows. There were slight evidences of rickets, the teeth were regular but not of Hutchinson type. Each drumhead was retracted, and there was a calcareous plaque on each membrane. The hearing was slightly defective. His tonsils were removed two months ago. The sense of smell was defective. By *x*-ray examination excessive digital markings could be demonstrated throughout the whole skull.

Some Types of Marginal Keratitis and their Etiology

Dr. G. E. de Schweinitz described diplobacillary marginal keratitis in the form of symmetrical patches at the upper and inner margins of the cornea, the ulceration being slightly indented and surrounded by a whitish border or rim. Bacteriological investigation showed the presence of the Morax-Axenfeld bacillus in large numbers, and zinc treatment was promptly efficient. He also described certain types of proliferating sclerokeratitis in gouty and rheumatic subjects of unusual type, characterized by an epibulbar mass of yellowish-red tissue at either the outer or inner corneoscleral margin, associated with an area of corneal infiltration, so pronounced in one patient that for a period of time

beginning epithelioma was suspected. These lesions disappeared when the patients came under the influence of large doses of salicylate of sodium; in one patient, who could not take this remedy, salophen in large doses was efficient. He also described certain small lesions which closely resembled aphthous patches in the mouth, which occurred at the margin of the cornea in patients during attacks of acute indigestion, and which disappeared rapidly after light cauterization with nitrate of silver, associated with correction of diet. He recommended in place of the silver the use of chlorate of potassium. He also related the case history of one patient who had had a number of attacks of choroiditis of one eye and a number of attacks of corneoscleral ulceration in the opposite eye, the two lesions appearing to alternate, that is, the keratitis and the acute choroiditis were never co-incident. The etiological factor was not discovered; syphilis and tuberculosis were eliminated by the usual tests, and the best results had been obtained by an eliminative treatment.

Sarcoma of the Choroid

Dr. George S. Crampton described a case of sarcoma of the choroid in the left eye of a man, aged fifty-six years, the only symptom of which was described as a slight veiling of the upper temporal visual field during the preceding two months. There was no pain or other symptom to attract attention, and there was no history of traumatism. Aside from a complete arcus in each eye the external appearance and functions were normal. The tension of each eye was about 20 mm.

The lens of the affected eye showed very fine, almost imperceptible, opacities throughout; they were more numerous in the periphery. A rounded almost spheric mass smoothly covered with retina appeared to extend upward from the anterior floor of the fundus close to the ciliary region, and was thought by one competent observer to be a cyst of the ciliary body; on section, however, it was found to be situated much farther backward, at the juncture of the middle and posterior thirds.

The ophthalmoscope showed a few folds where the retina was pushed forward by the pea-like growth about the sides of which, and surrounding it, trivial retinal detachments could be seen. The overlying retinal vessels could be plainly made out; there were indefinite patches of choroiditis and minute hemorrhages on its surface. Elsewhere the retina, while slightly edematous, was otherwise normal. The central vision was 6/9, with a fairly concentric contraction of the field. Transillumination on account of the small size of the tumor was variable, but by using a light of small aperture a dark shadow was obtained.

After enucleation a globular tumor $5\frac{1}{2}$ mm. in diameter was found beneath the retina as stated, at the junction of the middle and posterior thirds of the lower fundus in the median line, and behind this a small plaque-like growth, 4 mm. in diameter and closely adherent to the sclera, extended almost to the margins of the nerve. This on further section may prove to be the peduncle of the larger growth. As the celloidin in which the specimen was imbedded failed to harden, a detailed pathological report cannot be made at this time.

Massive Exudate in Hyaloid Canal Following Traumatism

Dr. George S. Crampton exhibited a man, aged forty years, who twenty-seven years previously had fallen upon a wooden whipstock while running. The end of the stick, which was $\frac{5}{8}$ of an inch in diameter, punctured the left upper lid and entered the orbit, thereby causing severe pressure upon the eyeball and rupture of the orbital tissues. The eye was permanently blinded. Aside from the usual surgical treatment during the few weeks following the accident, the records of which are not at present available, he states that he has had no treatment until yesterday, when he presented himself for the removal of a foreign body in the other eye, and he had not been examined by an oculist for twenty-six years. The vision of the right eye was 6/6 while the left was blind and divergent. The excursion was normal and the

pupil but little larger than the right. There was consensual and direct response to light in the normal eye only. The eye has always been quiet and free from pain. The lens was clear except for a few trivial, web-like opacities in the posterior cortex or capsule, and the vitreous was practically free from floating opacities.

Springing from the entire surface of a round disk of normal size a large conical mass, becoming rapidly smaller and roughly cylindrical as it passed forward, seemed to largely fill the hyaloid canal to a point just below and behind the lens. There were a few delicate, lateral twigs midway which extended into the vitreous. The disk appeared as though it had been cupped and then filled with the white mass, as the vessels sprang from its periphery and passed out to a fairly normal appearing retina. There were, however, small, irregular areas of disturbed pigment about the disk. The tension was normal.

Dr. Hansell stated that, in his opinion, this patient, illustrated one of the many varieties of vitreous opacities caused by the congenital remnants of the hyaloid canal and vessels, modified perhaps by inflammatory changes induced by their presence. In a patient recently under observation at the Jefferson Hospital the posterior lens capsule was opaque and vascular on the temporal side. Immediately behind and connected with it was a membranous opacity in the form of a cyst, with tails extending back to the region of the new head. The connection with a retinal vessel on the disk, usual in these anomalies, could not be made out. Vision was reduced to light perception, and the eye rotated inward. The right eye was normal.

Extensive Coloboma Surrounding the Optic Nerve with Retained Hyaloid Artery Joining Nerve and Lens

Dr. George S. Crampton exhibited an extensive coloboma surrounding the optic nerve of a girl sixteen years of age whose left eye had been divergent since birth. The vision of the right eye was 6/6−3 while that of the affected eye was reduced to

vision of fingers at one meter. The cornea, iris, and lower choroid were free from congenital defects. A small opaque spot low down on the posterior side of the lens showed the attachment of a well-formed tightly stretched hyaloid artery the other end of which found an attachment on one of the centre vessels of the nerve head. The vitreous was clear and the peripheral fundus free from apparent defects. The disk was round, pale, and poorly defined. The vessels arose from its centre in a fairly normal manner and spread over the floor of a huge circular cavity surrounding the nerve.

The floor of this cavity appeared to be on the same general plane as the nerve head, both being deeply set beyond the sharply defined limits of the surrounding normal fundus. The area of the coloboma was thirteen and one-half times as large as that of the disk. The depth was difficult to estimate. The floor was of a pale greenish-white color thickly scattered with accumulations of pigment, many of which were the shape of bone corpuscles. These masses were more closely approximated below. The walls of the cavity were sharply defined and slightly undercut especially below where the retinal vessels disappeared from view before passing to the surrounding fundus which was myopic about two diopters and of good color. There were no evidences of myopic stretching as is sometimes made evident through the uncovering of the choroidal circulation. The retina surrounding the cavity became slightly paler right at the brink of the precipice-like depression and the sharp edges were outlined with pigment.

A Case of Sympathetic Ophthalmia

Dr. William Zentmayer showed a case of sympathetic ophthalmitis in a boy fourteen years of age. The patieut was struck in the left eye by a snow ball fifty-four days ago. The eye had given him but little pain and the only treatment he had received was drops for the eye prescribed by a physician, who saw him but a few times and not until thirty-three days after the accident. He was first seen at Wills Hospital five days ago. In the left eye

there was a large prolapse of the iris through a wound at the upper sclerocorneal limbus. Slight ciliary tenderness and injection, faint deposit on the anterior capsule of the lens. Media too hazy for ophthalmoscopy. The right eyeball was deeply congested, the pupil was small, the media hazy and there was marked neuroretinitis. Vision: R. E., 5/xx; L. E., fingers at 1 foot. The left eye was enucleated the following morning. Two days later the right eye was almost free from congestion and the pupil was fairly dilated. The vitreous was very cloudy and there was marked neuroretinitis with enormous distention and tortuosity of the retinal vessels comparable only with that seen in polycythemia. The treatment was sodium salicylate after the method of Gifford, inunctions of 1 dram of unguentum hydrargyrum once daily, leeching at the temple, hot compresses and atropin. Dr. Zentmayer asked for suggestions as to treatment.

The blood examination showed:

White blood cells, 14,000. The differential count gave: polymorphonuclears, 81.2 per cent.; small mononuclears, 8.4 per cent.; large mononuclears, 6.8 per cent.; transitionals, 0.8 per cent.; eosinophiles, 2 per cent.; mastzellen, 0.8 per cent. Hastings' stain was used. This does not indicate an increase in the number of large mononuclear leukocytes chiefly at the expense of the polymorphonuclears, as has been found by Gradle, Browning and Frankes.

Dr. Ziegler spoke of the success which he had had with phylacogens in sympathetic ophthalmia and certain types of choroiditis. He had also had favorable results from the administration of turpentine.

Dr. Zentmayer said in reply to Dr. Ziegler that a recent experience with phylacogens had not helped to establish his confidence in the use of this remedy. He had recently lost an eye from pneumococcus ulcer of the cornea of a woman. A trial had been made of these bacterines but they failed to be of value. He recalled having seen the essential oils recommended by an English surgeon in the treatment of iridocyclitis, and would try one of them in this case.

Eye Injury Following Explosion of Golf Ball

Dr. William Campbell Posey gave the notes of the case of a child two years old whose right eye would probably be lost from a burn following the explosion of a golf ball. The injury resulted from the mother's attempting to show the child the contents of the ball by biting into the core with her teeth. The explosion which followed emptied the contents of the ball into the child's eye and badly burned the mother's mouth. The ball was said to be either the "Domino" or "Baby Dimple Ball," manufactured by Spalding & Co. The contents of the ball have not yet been analyzed.

Dr. Posey referred to similar cases reported before the Section by Drs. Carpenter, Baer, and Langdon, and referred to another case which he had had in his own practice. He said that Casey Wood had found the contents of the balls to consist of zinc salts; in the two cases exhibited before the Section a strong alkali had seemed to be the cauterizing agent.

APRIL 16

Associated Contraction of the Frontalis in Lateral Movements of the Globe

Dr. William Zentmayer demonstrated a case in which contraction of the frontalis muscle occurred when the eye was abducted. There was an esotropia, with limitation of the outward excursion of the left eye when the patient looked to the left. When an object was fixed and carried to the left the excursion was almost full, and accompanying the increased effort of abduction a marked contraction of the frontalis took place, unaccompanied by widening of the fissure or elevation of the lids.

Dr. Krauss recalled a case of associated movements of the eye which he had reported many years ago. It was in an eight-year-old boy who had a congenital unilateral complete ptosis which entirely disappeared when the patient extruded his tongue. After a period of training, the ptosis was greatly improved.

Coloboma of the Eyelid

Dr. Mary Buchanan (by invitation) showed a case of coloboma of the lid in an Italian infant, two months old. The patient was referred to the Woman's Hospital by Dr. Mercedes Roberts, who delivered the mother of twin girls, the sister being perfectly normal and weighing at birth about a pound more than the patient. There was a common placenta, with separate amniotic sacs.

The coloboma was to the inner side of the median line of the left upper eyelid; it was 2 mm. wide and about the same height, with a rounded apex above. It included the skin, conjunctiva, and cartilage; the lashes stopped at each lower edge of the coloboma.

The cartilage did not seem to have formed above the cleft. On the brow exactly above the cleft was a soft pedunculated mole, just about large enough to fill in the defect. There was a dacryocystitis on the same side. There was no coloboma of either irides or choroid or other abnormality of the eyeball. The tragus of the left ear showed two fleshy moles larger than the one on the brow. The left thumb-nail was abortive. No other abnormalities were noted.

The smear from the lacrimal sac showed staphylococci. Wassermann and Noguchi tests were negative.

Subsequently autogenous vaccines made from the lacrimal discharge were used and the dacryocystitis promptly disappeared, although it had resisted all the generally used drugs. Just as it was thought safe to operate, the patient developed gastro-enteritis and died. No autopsy was held.

These cases are rather rare, Parsons (1906 edition) says that about 100 have been reported and I have been able to find 5 cases since then.

The lid defect is often associated with hare-lip, cleft palate, coloboma of iris, supernumerary ears and fingers. The upper lids are usually affected and the cleft is generally to the nasal side. Clefts in the lower lid have been reported.

The etiology of hare-lip and cleft palate will not fit here because the lids are not formed from the sides to meet in the centre; they grow from above and below the cornea, and meet at the palpebral fissure where they unite for a time. The best explanation is that amniotic bands cause a displacement of some cells, so the little excrescence on the brow of the present case was probably formed of the cells which should have grown down to the lid margin.

Dr. Zentmayer said that some years ago he had seen a case of coloboma involving the inner third of the left upper eyelid associated with bilateral microphthalmos and orbital cysts. The optic foramen and optic nerve on the left side were normal. There was no optic foramen on the right side. The chiasm and external geniculate bodies were absent. Cleft lip and supernumerary tragi were present.

Three Cases of Acute, Double Optic Nerve Atrophy

Dr. Howard F. Hansell showed three cases of acute, double optic nerve atrophy. The first patient became suddenly blind in both eyes twelve hours after the ingestion of wood alcohol which she had sweetened and diluted. The optic disks appeared normal until about a week after the onset of the blindness, when they became pallid and rapidly passed into white or total atrophy without the signs of neuritis. Her many years of poverty and drunkenness were doubtless a prominent factor in the etiology, having prepared the optic nerves for the final assault of the methyl alcohol.

The second patient was a woman, aged thirty-four years, who for ten years had led a shockingly dissipated life. Her last debauch led to pneumonia. Two days after admission to the hospital she suddenly became totally blind and remained so for sixty hours. Central vision returned, 20/200, the fields were con-

centrically contracted to within a few degrees of the fixation point. The disks, at first normal, rapidly became white, beginning on the temporal side and in a few days involving the entire nerve head. This woman drank immoderate quantities of alcohol, often, she states, consuming a bottle of absinthe in the course of a night.

The third patient died three weeks after admission. He gave an unreliable history of having lost the sight while at supper some days earlier. The nerve was perfectly white and the retinal arteries almost invisible. Postmortem showed, under the surface of the right frontal lobe, a black nodule measuring 3 x 2 mm. Many of the cerebral bloodvessels and the left fifth nerve were infiltrated by a black mass. The central ganglia and the internal capsule were normal. The left eye was shrunken and contained a greenish-black mass. Five cm. posterior to the bulb of the left optic nerve there was a lobulated, nodular mass 15 x 15 x 10 mm. Some of the nodules were black, some gray, and some yellowish gray. The perineurium at the chiasm and the surface of the right optic nerve was underlaid by diffuse and circumscribed black masses. Diagnosis: disseminated melanotic sarcoma.

Dr. Holloway stated that the members of the Section would probably recall the patient he had exhibited several years ago, who had developed an optic atrophy following ingestion of methyl alcohol. It will be recalled that this patient was in the habit of utilizing his infirmities to secure hospital attention, and only recently had been admitted again to the University Hospital. He thought the quantity of alcohol consumed by Dr. Hansell's patient illustrated very well the question of individual tolerance. He thought every ophthalmologist should use his personal influence in excluding methyl alcohol from the home. This substance is used quite extensively when resorting to cabinet sweats and for a little additional expense the much less dangerous ethyl alcohol could be used with much more safety to the individual and possibly to other members of the household.

In reference to Dr. Hansell's third case, it seemed to bring

out some of the points alluded to by Foster Kennedy in his paper concerning growths of the frontal lobe.

Dr. Shannon suggested that traumatism might have been the cause of the atrophy in Case II.

Dr. Krauss stated that the etiology of sudden blindness due to optic atrophy was sometimes difficult to establish. He had several cases under observation in which wood alcohol, syphilis, brain tumor, or other nervous diseases could be excluded, the only known factor being exposure to wet and cold continued for many years. He had occasion to warn some manufacturers of the use of wood alcohol in their business as some of their men had been afflicted with temporary loss of vision. It was with difficulty that they were convinced.

Dr. Zentmayer: Just a word as to the pathology of methyl alcohol blindness. Dr. Hansell favors the view that it is due to an interstitial neuritis. It is difficult to understand how a blindness coming on as suddenly as it does in these cases can have this cause. The view, which is now generally accepted, that the primary trouble is a degeneration of the ganglion cells, with the changes found in the optic nerve secondary thereto, accords more with the clinical facts. That this part of the retina should suffer most, may be explained by the law that the most highly functionating organs or parts, are most susceptible to toxic agents.

Dr. Chance said that as he had knowledge of numerous cases of blindness dependent upon the careless use of wood alcohol he hoped that this Section would make the subject of the dangers attending the use of wood alcohol an object of special inquiry as he believed such action had not been made by the College. He regarded such an inquiry as timely for, as these cases presented by Dr. Hansel, and Dr. Holloway's recital, amply show, the opportunities for such dangers are still increasing.

Dr. Hansell in closing: Dr. Shannon suggests that accident might have been the cause of the atrophy in Case II. This supposition may be excluded by the x-ray findings. Moreover, the history points to alcoholic amaurosis. It is almost inconceivable that any human being could consume, without serious

damage, the amount of alcohol which she confesses to have drunk. She stated that on more than one occasion she had emptied a bottle of absinthe in one night and satisfied the remaining thirst with whiskey and gin.

Atrophy of the Choroid with Extensive Sclerosis of the Choroidal Vessels

Dr. T. B. Holloway exhibited F. M., Italian, aged forty-one years, who was referred from the Phipps Institute to the Eye Clinic of the University Hospital, on March 13, 1914. The vision of the right eye was 6/9 and of the left 6/30; unimproved. Ophthalmoscopic examination of the left eye showed a small posterior polar opacity of the lens and a number of delicate translucent vitreous opacities. There was a suggestion of an underlying yellowish pallor of the disks, but the retinal vessels showed but little change. Above to the nasal side, and below the disk for a distance of two disk diameters, there was a grayish area mottled with brownish pigment. Beyond the macular region and the grayish areas, there was wide-spread exposure of the choroidal circulation, and practically all the vessels showed more or less sclerosis, in some no blood-stream being apparent. In the periphery a few discrete, small pigment clumps were noted. The right eye presented an analogous picture. The form fields were markedly contracted, and color perception was confined to fixation.

The patient had an extensive lesion of the apex of the right lung. A Wassermann test was negative. While night-blind, he could not state when this was first noted. There was no history of consanguinity.

Dr. Shoemaker thought that the case was more typical of simple sclerosis than of some other conditions in which sclerosis played an important part. The disk, retina and vessels were not of the character usually found in retinitis pigmentosa, and, while the case might be considered an atypical form of retinitis pigmentosa

as suggested by Dr. Holloway, choroidal sclerosis would seem to be a more satisfactory diagnosis.

Dr. Holloway stated that in judging from the literature there seemed to be but little choice between the title assigned and atypical retinitis pigmentosa. He felt that it probably would be better to regard this as an atypical case of the latter affection. He stated that the condition of the disk and the retinal circulation was better than one would expect to find in a case as far advanced as the one under discussion. Judging from the plates, he thought the fundus picture in this case corresponded more closely to that by Levinsohn.

Dr. Hansell remarked that Dr. Holloway's patient did not present to him any of the usual signs of retinitis pigmentosa. The choroidal and retinal pigment had not been collected in patches or along the retinal vessels as we commonly see, but seemed to have been almost completely absorbed, and the degeneration and atrophy, while not confined to the macular region, were more pronounced and advanced there than in the periphery. The appearances suggested syphilitic areolar chorioretinitis in its final stages.

In conclusion Dr. Holloway stated that he did not wish to be misunderstood in reference to his remarks, but he thought that this case might be included with the retinitis pigmentosa group, possibly being what Mr. Hutchinson has seen fit to refer to as the mongrel type. He thought these cases were frequently extremely difficult to classify.

A Case of Coloboma of the Optic Nerve

Dr. Burton Chance reported a case of coloboma of the optic nerve entrances, in a middle-aged woman, the subject of keratitis of a tubercular type. The globes were of normal size and presented no other anomaly of structure or function, being practically emmetropic, and the visual acuity, when the inflammatory symptoms became allayed, equalled 5/15 in each eye.

The nerve entrance in the right eye appeared to be several times the size of a normal disk; it seemed as though it had been punched out of the sclera. The scleral rim was quite sharply defined; the nerve seemed to be deeply funnelled to an apex quite 30 diopters distant. The sloping sides were without uveal pigment but the temporal aspect seemed so dense and of a glacier-green aspect that it was assumed to be the lamina cribrosa. The vessels came out of the nebulous apex at the nasal side, and sent branches straight to the fundus; the temporal, stretched directly across the funnel. The choroid and retina were entirely intact. In the left eye the disk was not so deeply funnelled and the vessels were branched in the usual manner. Neither the choroid nor the retina in this eye was affected.

He showed also a water-color drawing of another case which he published several years previously, but which had not been seen by the members of this Section.

It was the case of the child included in Dr. Crampton's complete paper on the subject. Dr. Chance said he had been fortunate in seeing quite a large number of more or less complete colobomata of the optic-nerve entrance presenting no accompanying imperfections of the choroid and retina, perhaps, because his friends had known that he was particularly interested in the congenital malformations of ocular structures. In this connection, he had found it interesting to note that while most of the works touching on the subject of psychical degeneracy have included in them lists of congenital malformations of ocular and other nervous structures, which defects were believed to contribute to such degeneracy, he had found very few malformations in a large series of such presumed-to-be degenerates. On the contrary, he could recall but one case, that of a child with aniridia of each eye, as total as he had ever seen, whose mentality was not of the brightest, indeed all the cases he could remember had been in those of unusual mental capacity. In a systematic and routine study of the patients at the Pennsylvania Hospital for the Insane, extending over two winters, he found but two or three instances of deformed eyes.

A Case of Rupture of the Choroid

Dr. Charles R. Heed exhibited a boy of fourteen years who had been struck in the left eye with a base-ball six months previously. The fundus presented a horizontal rupture of the choroid situated one-half disk diameter below the papilla. There was a small oval atrophic spot in the choroid at the temporal edge of the disk. The macula and remaining areas appeared healthy. Vision with correcting lens was 6/6 in either eye.

Dr. Holloway stated that the interesting points in connection with Dr. Heed's case seemed to be the location of the rupture and the good condition of the rest of the fundus. He referred to a patient who had been struck in the eye by a blunt arrow, causing a rupture in a similar position to the one described by Dr. Heed, although not as marked. Another patient had recently come under his observation who presented fundus conditions analagous to those shown in the colored drawing exhibited by Dr. Heed. This patient was a sailor who had been struck in the left eye by a pin from an anchor chain, and when first seen had a small hemorrhage in the anterior chamber and an iridodialysis on the temporal side of about one-third the circumference of the iris. The lens was dislocated inward and there was a hemorrhage into the vitreous. Later a double vertical rupture of the choroid associated with a mass of dense pigmentation, could be noted at the posterior pole of the eye.

Tubercular Sclerokeratitis Treated with Tuberculin

Dr. George S. Crampton exhibited an unmarried woman, aged twenty-four years, whose right eye had been under treatment for tubercular sclerokeratitis for the past nine months.

When she first presented herself for treatment eight months ago she gave a history of having had some soreness in the right eye during the previous month or six weeks for which she had used simple remedies without improvement. At this time the vision was R = 6/60; L = 6/9+4. The right eye was alone affected.

There was moderate pericorneal injection confined to the upper nasal quadrant and extending nasalward to surround a hard, pointed prominence in the sclera situated about 3 mm. from the limbus. This swelling was tender and painful and appeared as a typical scleral node except that its apex was slightly broken, giving it somewhat the appearance of a large phlyctaine. The cornea was clear and the lens, aside from one delicate linear opacity extending upward from the lower periphery to a point 2 mm. from the centre, was clear.

The iris was normal in appearance and responded well to the usual stimuli. The vitreous was clear but a rather high degree of astigmatism made the disk seem distorted, and blurred in outline. There were also certain anomalous changes in the form of the disk and vessels which led one to think that this eye had never been equal to its fellow in visual power. The general fundus, however, seemed healthy. The girl was robust in appearance and had always been healthy, and aside from a perverted life, sexually, had lived under good hygienic conditions. There was nothing in her history or physical examination pointing to either rheumatism, tuberculosis or syphilis and her blood gave a negative Wassermann reaction. A positive von Pirquet was not considered of much value on account of her mature age. During the first two months there was considerable constipation which was overcome by the cultivation of regular habits. There was a slight gain in weight under treatment possibly due, however, to a less arduous mode of living than that to which she had been accustomed as a book-keeper in a busy office. The scleral condition changed but little under the various methods of treatment which were tried and included at different times; sodium salicylate, asperin, potassium iodid, a bitter tonic, etc., internally, with an equally varied list of local instillations which included atropin, dionin, massage with iodin-vasogin, etc. Treatment apparently being of no avail she was placed under the care of a nurse so that a careful observation of the temperature changes preceding and during the subcutaneous administration of tuberculin might be made. When third-hour readings had shown a

normal temperature for three days she was given an injection of 250 mgm. of old tuberculin which was followed by no febrile reaction. $\frac{1}{100}$ mgm. also gave no reaction but there was a reaction to 102° on the administration of $\frac{1}{50}$ mgm. On the completion of the diagnostic tuberculin test she was placed on ascending doses of albumose-free old tuberculin injected into the arm. Bi-weekly injections given over a period of several months were started with $\frac{1}{250}$ mgm. and were increased with the greatest care so as to prevent a general or ocular reaction. On two occasions, however, a small local area of induration at the point of injection, together with headache and a rise of temperature to 101°, accompanied by a slight ocular reaction, followed the injection. Under a high magnification a group of blunt bloodvessels were seen to extend centrally about half as far as the infiltration.

The first scleral node to the nasal side of the cornea gradually disappeared only to be replaced in a couple of weeks by a similar one on the temporal side and then two small clouded areas of infiltration appeared in the margins of the cornea nearby and below. These nebulous patches were dense at the limbus and faded gradually into clear cornea about 2 or 3 mm. from the margin.

Following the last general and local reaction, but possibly not due to this cause, a small round area of superficial infiltrate appeared in the centre of the cornea, this made its appearance a month ago and has varied in density since, sometimes almost disappearing and again as at present becoming quite dense and threatening. About three months ago in spite of the continual use of atropin a couple of small points of posterior synechia were seen and at times the iris has responded poorly to the cycloplegic but at no time has the pupil been smaller than 6 mm.

Following a slight increase in body weight during the first two or three months there has been a moderate reduction accompanied by slight pallor. She has felt well, however, and has enjoyed a good appetite and has been free from cough. At times she had a scattered papular eruption on the face which seemed to be due to the tuberculin but this could not be proven as it might have

been a late result of the potassium iodid which had been discontinued before it came on.

About the third month after the appearance of the first scleral node, the lids of the affected eye became thickened and indurated and the overlying skin showed minute excoriations. The thickening of the lids disappeared in a couple of weeks but the condition returned in a less severe form following the local reaction to the tuberculin.

The right pre-auricular gland has been enlarged to the size of a lima bean but there has been no pain or tenderness.

In all there have been three scleral nodes and two patches of marginal infiltration of the cornea. The small central infiltration has been the only one to appear at a point away from the limbus.

At the present time the weekly injections have reached a strength of $\frac{1}{4}$ of a cgm., and recovery is practically complete. The other eye has at no time shown any tendency to inflammation and remains as at first a practically normal eye.

Note.—After several months of absolute freedom from symptoms there was a recurrence of the condition and tuberculin was again resorted to.

Dr. Hansell: The Fellows may remember that at the meeting two months ago I exhibited four patients with tubercular keratoiritis. Three showed positive von Pirquet reaction. The fourth, a colored child, showed not the slightest reaction after two inoculations, but subsequent examinations proved the presence of numerous tubercle bacilli in the feces. Under tuberculin, beginning with $\frac{1}{20000}$ mgm. and increasing the dose, the ocular inflammation rapidly improved.

OCTOBER 15

An Interesting Tumor of the Eyelid

Dr. Howard F. Hansell exhibited a colored boy, aged eighteen, who had a polypoid growth extending from a point near the middle

of the palpebral surface of the upper lid, the nature and origin of which were obscure. The history, family and personal, as recorded by Dr. Tassman, interne of the Philadelphia General Hospital, strongly suggested tuberculosis. The cervical glands on both sides were large and hard, but showed no sign of breaking down. The chest was free from complications. The centre and alæ of the nose were deeply ulcerated, diagnosed by Dr. Henry W. Stellwagon as probable lupus. The cornea, in its lower temporal quadrant showed the scar of a perforated ulcer. The conjunctival growth may have been simply a hugh granulation following a ruptured chalazion of which there is no history or indication of its previous presence, or a part of a systemic, scrofulous or tubercular affection. The nasal necrosis, which commenced six months ago, pointed to syphilis rather than lupus because, as Dr. Stellwagon said, "the progress has been more rapid than is usual in lupus," but the Wassermann test was negative. Microscopic examination of the tumor may throw light on the etiology.

A Case of Congenital Interstitial Keratitis

Dr. J. B. Turner showed a typical case of congenital interstitial keratitis in a boy sixteen years of age. The Wassermann was positive and the lad improved on mixed treatment. Vision, R. E. = 6/60; L. E. = 6/30. There was marked pigment disturbance in the periphery of each fundus.

A Case of Zonular Cataract

Dr. William Zentmayer exhibited a zonular cataract in an Irish girl, eighteen years of age, who had been always nearsighted. So far as could be ascertained there was no hereditary ocular affection. A maternal aunt had a retained pupillary membrane. The teeth were rachitic. In both eyes there was a zone of very delicate opacity between the nucleus and the capsule, scarcely visible except at the margin of the opacity. In the anterior

cortex, radiating from the pole, there were faint linear and leaf-shaped opacities made up of pin-point dots. The opacities in the two lenses were absolutely symmetrical. In the left eye there was a small circular coloboma or pit of the optic papilla.

Intradural Tumor (Psammo-endothelioma) of the Optic Nerve

Dr. G. E. de Schweinitz reported the case history of a girl, aged eleven, from whose right orbit he had removed a large intradural tumor of the optic nerve. The eyeball was exophthalmic, divergent and slightly depressed. The lateral movements were unimpaired, the upward and upward and outward rotation was limited. The disk was entirely atrophic and the eye absolutely blind. The condition had been of gradual development, and for four or five years was entirely quiescent, when there was a rapid increase in pressure manifestations and exophthalmos, associated with deep orbital pain. It was impossible to remove the growth without enucleation of the eyeball.

The histologic picture of the growth was that of a psammo-endothelioma, the bulk of the tissue being made up of a coarsely and irregularly interwoven network of fibrous tissue, in the midst of which were found numerous concentrically laminated psammoma bodies. Groups of comparatively large embryonic connective cells of variable size were evident, provided with fairly large, round and oval nuclei. These were apparently of endothelial origin, and in some fields their relation with small bloodvessels was clear, such vessels being seen in longitudinal section, often with branches, showing their walls formed of multiple layers of these elements, or they were seen in transverse section as whorls of endothelial cells, sometimes with the diminished lumen still distinctly appreciable, sometimes solidly closed. In this more or less fusion of the cells could be made out, apparently with hyaloid change, and in a few places the development of the psammoma bodies in these masses of endothelial proliferation was evident.

Brief reference to other psammomas of the optic nerve was made, and Adami's views that these psammomas are practically always of endothelial origin, their appearance being due to localized overgrowth of the capillary endothelium, were discussed, inasmuch as they were confirmed by the sections exhibited. The paper was illustrated with photomicrographs.

Hypertrophy of the Conjunctiva

Dr. William T. Shoemaker exhibited a colored boy fourteen years of age, who aside from his ocular condition seemed to be in standard health. His left eye has remained essentially as it now is for at least three or four years.

There was an enormous overgrowth of the lymphoid elements of the palpebral conjunctiva and that of both lower and upper fornix, throwing the conjunctival surface into many tumor-like elevations, crowded together, and thus more or less polygonal in form. They were particularly numerous in the upper fornix; the upper tarsal conjunctiva and bulbar conjunctiva remaining relatively free. The lids were thickened and heavy; the palpebral fissure was narrowed.

There was no pain, no itching, and no secretion other than tears. The right eye showed evidences of a similar process, but has never been so bad. Several years ago a small piece was cut from the conjunctiva and reported upon by the laboratory as "simple hyperplasia." Efforts have since been made to secure another and more elaborate examination but the patient refused permission.

Dr. Shoemaker stated that he had been unable to make a satisfactory diagnosis of this condition. There are several conjunctival diseases that it might be, but it would not seem to accurately correspond to any of them. If tuberculosis for example, it does not well fit into Eyre's classification, unless perhaps it would come under his Group II, characterized by the presence of greenish or yellowish sub-conjunctival nodules, seldom larger than a hemp

seed. This condition, according to Eyre, through growth and proliferation of the tubercles passes into Group III, with its florid, hypertrophied papillæ, and outgrowths of granulation tissue, usually from the fornices.

The case under discussion, however, is of very long standing, and has not seemed to be inflammatory, in which case it might be a degeneration. The possibility of its belonging to that very rare variety of conjunctival disease known as hyaline, amyloid or colloid degeneration has been considered, but my limited knowledge of this condition would not justify more than a thought or two in this direction. Some encouragement, however, is given to this idea, by two cases of hyaline degeneration, described by Vossius.

They occurred in young, otherwise healthy subjects. They exhibited firm, smooth, pale reddish-yellow tumors growing from the neighborhood of the fornix. These consisted of masses of adenoid tissue with hyaline degeneration, which gave the hyaline reactions with suitable reagents. Most of the cases reported have come from Russia.

At the time the sketch was made, two and a half years ago, the appearances were not unlike those described by Vossius.

Raehlmann was the first to find hyalin in the conjunctiva, and regarded it as a precursor of amyloid, and Kubli recognizes four phases of the condition as found in the conjunctiva:

1. Simple adenoid proliferation.
2. Hyaline degeneration.
3. Amyloid degeneration.
4. Calcification and ossification.

My case made a fair start, and may now be progressing along these lines.

A Case of Follicular Hyperplasia of the Conjunctiva

Dr. George S. Crampton reported a case of Follicular Hyperplasia of the Conjunctiva in a robust white boy aged eighteen years. Five years previously a smooth, soft mass was discovered

beneath the inner angle of the left upper lid, but as it was unaccompanied by pain or other uncomfortable symptoms but little attention was paid to it.

As the swelling gradually increased the mass became annoying on account of its size, and relief was sought. On examination the palpebral conjunctiva of both eyes was found closely studded with large, soft, pink masses which were diagnosed clinically as follicular hyperplasias. Larger masses were found in the left eye, one of which, the shape of a small lima bean, protruded 8 mm. from beneath the inner angle of the upper lid when the eye was opened naturally. On everting the lids this mass was seen to spring from the upper fornix and was slightly connected also to the conjunctiva of the inner angle of the lower lid. The caruncle was apparently not involved. On everting the lower lid the hypertrophied conjunctiva fell forward in two large folds. There were no evidences of ulceration or discharge. Aside from slight hyperemia the conjunctiva was normal as were also the corneæ and fundus. The vision of the right eye was 6/12 and that of the left 6/21.

Not wishing to disturb the conditions or alarm the patient, it was decided to have a picture painted before an attempt was made to excise a portion of the tissue for examination. Unfortunately the boy disappeared upon the completion of the picture and as he had given two false addresses it has been impossible to find him to complete the examination. Thinking he may have come under the care of one of the Fellows of the Section, the liberty is taken of showing the picture at this time.

Traumatic Subluxation of the Lens

Dr. Frederick Krauss showed a man, forty-eight years old, who was struck in his left eye two months before by a base-ball, causing a partial dislocation of the lens up and out. The eye remained perfectly quiet, the lens being transparent throughout. His vision was 5/15 with a minus 2D. The lens blocked the tem-

poral side of the anterior chamber, but as the angle was clear on the nasal side, glaucoma symptoms were absent.

In the absence of serious symptoms, Dr. Krauss believed that non-interference would give the best results.

NOVEMBER 19

Triple Rupture of the Choroid

Dr. Leighton F. Appleman exhibited a case of triple rupture of the choroid with iridodialysis following a blow on the eye with a base-ball.

When first seen the anterior chamber was partly filled with blood and no details of the deeper structures could be made out. Vision was 1/60.

Later, dense vitreous opacities were seen, and after these had cleared, three ruptures of the choroid, concentric with the disk on the nasal side, could be made out; one, situated about half-way between the disk and the macula, was long and narrow, extending from slightly above the level of the disk nearly to the inferior pole of the eye; the other two were two and a half disks' diameter from the disk in the mid-zone, running vertically, and wider than the first. Some disturbance had also been produced in the macular region.

Under the use of heat, atropin, and dionin the opacities in the media largely disappeared and his vision rose to 6/21.

Dr. Appleman called attention to the relative infrequency of triple rupture as compared to double and single rupture, and quoted reported cases.

Dr. Holloway stated that in reference to concussion injuries of the eye, most of the cases that had come under his observation had developed while in pursuit of one of the various branches of athletics or in the younger children while at play. In the latter group many cases were seen as the result of the toy rifle that shoots

a BB shot. He thought that in athletics most of the cases developed as the result of base-ball accidents. He had seen one other case of triple rupture of the choroid that resulted from the eye being struck by a stone. In this particular case the ruptures were in the usual position on the temporal side of the disk. He had also seen several cases of double rupture of the choroid, the most extensive one being in the case he had referred to at a previous meeting of the Section. In this case the ruptures had occurred on the temporal side and were associated with extensive iridodialysis and partial luxation of the lens. While in certain districts occupational accidents might give rise to the majority of concussion cases, such had not been his personal experience.

Dr. Zentmayer said that the course of Dr. Appleman's case well illustrated the care that should be observed in the prognosis of contusions of the globe. Here the simple occurrence of rupture of the choroid would have justified a good prognosis as the presence of a macular lesion was obscured. The occurrence of Berlin's edema is sometimes associated with, or results in, a hole at the macula which could not be seen and might not be suspected at the first examination.

Spontaneous Dislocation of Cataractous Lens into the Anterior Chamber

Dr. Frederick Krauss reported a case of spontaneous dislocation of a cataractous lens into the anterior chamber. The lens was slightly smaller but thicker than normal, very dark brown, and very hard to the touch (cataracta brunescens). It was completely dislocated into the lower angle of the anterior chamber and was readily removed with the wire loop, though considerable fluid vitreous escaped at the time of the original incision. The eye made an uneventful recovery with gradually increasing vision. The accident occurred in a seventy-eight-year-old man, who stated that he felt the jumping sensation in his eye while taking a warm bath. There was no history of traumatism.

Bilateral Macular Choroiditis Associated with Remains of Hyaloid Arteries

Dr. George S. Crampton exhibited an under-sized Jewish boy, aged eleven years, who had round areas of congenital choroiditis in each macular region, associated with the remains of the hyaloid arteries on each disk. There was divergent squint, with slight lateral nystagmus and inability to fix with either eye. The vision was R. E. = 6/60; L. E. = 6/21. Wassermann reaction negative.

Although of apparently healthy parents free from consanguinity, he had never been robust. The delivery was difficult, but instruments were not used; a congenital deformity of the right foot was later corrected by operation. He was an only child by his mother's first husband; by a second husband she had two healthy children.

In his second year the patient had severe summer dysentery with blood and mucus in stools. Every fall and winter he complained of a general itchiness, which was relieved promptly last year by antirheumatic treatment.

The mediæ of both eyes were clear. In the right there were two sharply defined circular areas which showed marked piling up of pigment, especially at the margins, together with patches of exposed sclera contrasting with the bright red of the choroidal circulation. Each area was about three times the diameter of the disk. One in the macular region extended to within a disk diameter of the papilla; the other was immediately to the temporal side of the first, and although almost touching it, remained discrete.

The disk was vertically oval and of good color, except that the outer one-third sector was atrophic. On the lower portion of the disk a pearly, translucent mass of tissue, one-fifth disk diameter in size, extended somewhat forward into the vitreous and was taken to be the remains of the hyaloid artery. The remainder of the fundus was practically normal.

In the left eye there was one large sharply defined circular area of choroiditis which included the macula. It was more deeply

pigmented and farther from the disk than the macular defect in the other eye. The disk was free from atrophy, but, as in the other eye, a pear-shaped mass extended forward from the vessels on the lower part of the papilla. In the left eye the central fundus showed considerable pigment disturbance while the periphery remained normal.

The Etiology of Trachoma as Presented in Prof. Axenfeld's Thesis

Dr. William Zentmayer read a translation of the conclusions found in Axenfeld's thesis on "The Etiology of Trachoma," published in the *Transactions of the International Congress of Ophthalmology*, which was to have been held in St. Petersburg in August, 1914. Following are the conclusions in abstract:

Neither microörganisms of the bacterial group nor blastomycetes are the cause of trachoma. There is undoubtedly a virus pathogenic to the eye. Trachoma is seldom acute. Bacterially sterile trachoma is transmissible. It is not significantly contagious by simple secretion inoculation. Trachoma free from follicles has never been demonstrated in man, if we exclude "inclusion blennorrhea." Marked racial and climatic predisposition is doubtful. Personal susceptibility differs. If acquired immunity occurs it is only relative and transient. The outlook for artificial immunity is as yet unfavorable. "Genital inclusion blennorrhea of the newborn" may present a complete picture of trachoma, but pannus and cicatricial sequelæ have never, as yet, been met with. Inclusion blennorrhea and trachoma virus are up to the present the only ones which have been found to be filterable and to produce virus pathogenic to the conjunctiva. The Prowazek-Halberstaedter body is a discovery of the first importance in the solution of the trachoma problem. They most frequently occur in trachoma and inclusion blennorrhea. Occasionally they are found in normal conjunctivæ, but this is rare and does not militate against their etiological significance, as well-recognized bacterial excitors of conjunctivitis are occasionally found in the normal

conjunctiva and in other forms of conjunctivitis and also at times cause atypical forms of conjunctivitis. In what relation desquamative epitheliosis and swim-bath conjunctivitis stand to trachoma needs investigation. The finding of the P. K. bodies has been limited to the conjunctiva in all its layers. The morphology of these bodies in trachoma and in inclusion blennorrhea is the same; whether they agree biologically is yet to be determined. They are best studied in section. The conception of an "elementary" and an "initial body" has aided in the comprehension of the life history of these bodies. Small inclusions are at times found in otherwise normal epithelial cells. The probability is that the P. K. bodies are neither cell products, artefacts, modified gonococci, nor the products of mucoid degeneration. That they are the accompaniment of trachoma and are not of pathogenic significance is not likely. They occur so rarely in other conjunctival affections that their discovery in questionable cases of trachoma has a certain significance and renders the diagnosis more certain, if not absolutely so, against other follicular affections. Their absence, however, does not exclude trachoma.

Inclusion conjunctivitis of the newborn is a world-wide and frequent disease. The demonstration of the P. K. bodies in this disease is much easier than in trachoma because of their greater number. Here they are of great diagnostic and prognostic significance. The virus is more resistant to silver than is the gonococcus, and consequently the Credé method is less efficacious. The coöperation of the dermatologist, the gynecologist, and the urologist is much to be desired in the study of this disease. The protozoan findings of Czapluski need not concern the critic. The cell findings of Junius have not given etiological results of value. The best prospects for the solution of the trachoma problem lies in the further investigation of the P. K. bodies. These findings give no pretext for a relaxation of our present prophylactic measures.

A Visual Acuity Test Object

Dr. Herbert E. Ives (by invitation) demonstrated his visual acuity test object, a full description of which can be found in the *Electrical World*, 1910, lv, p. 939. The ability of the eye to distinguish detail is a function of illumination or brightness. The higher the illumination in general the smaller the detail which may be distinguished, or the greater the visual acuity. The visual acuity has been used as a means of measuring brightness, but has been to some extent limited in accuracy by the lack of suitable test objects. Various forms of type or of arbitrary symbols have been employed. These, however, suffer from several defects. Among these are that the transition from one size to another is not gradual, and that the element of recognition enters in to assist the eye with certain details and not with others of the same size. These defects are not overcome by the practice of gradually varying the illumination, or the distance of the object, for the observer is conscious of the change and his judgment is affected. The ideal test object is one in which the size of the detail is the only variable.

In the apparatus devised the ideal cited is attained. A pair of opaque line gratings on glass are used with the lines so close as to be indistinguishable. These are superposed, and rotated about an axis perpendicular to their surfaces in front of an otherwise enclosed light source. The result is the production of dark bands on a gray field. The separation of these bands is altered continuously by the rotation of the gratings. The distance of the object and the flux of light entering the eye remain constant. Dark bands, whose visibility forms the test of acuity, may be varied continuously in their separation from invisibility to easy visibility. Besides its use in photometry this test object is suitable for eye testing in places where test types are now in use.

Dr. Zentmayer said that the apparatus Dr. Ives had demonstrated was undoubtedly an excellent test for visual acuity, but the problem that the working ophthalmologist had to meet was

to have a test that would meet two indications—the determination of the visual acuity and the refraction error, and on the whole the test-types met these combined indications very well. No test chart met either requirement in an entirely satisfactory manner. The confusion test-cards which are of real value in working out the refraction are very faulty as a test for visual acuity, and the optotype of Landolt, which was perhaps the best test-card test for visual acuity yet devised, was of little use in refraction work. He thought that the test which was exhibited by Dr. Ives would not prove practical in the consulting room.

Artificial Daylight

Dr. Herbert E. Ives (by invitation) described his studies in the subtractive production of artificial daylight, for full account of which see the *Journal of the Franklin Institute*, May, 1914.

Common illuminants in general have the color of incandescent solids at comparatively low temperatures, such as 2000° C., while the color of daylight corresponds more nearly to an incandescent solid at a much higher temperature, about 5000° C. This means that when giving the same measured illumination, our common illuminants as compared with daylight are deficient in blue and violet and have an excess of red, orange, and yellow radiations. This difference in the spectral character of artificial and natural light becomes apparent when matching colors is attempted. For instance, purples will appear more reddish under most artificial illuminants than under natural light, owing to the deficiency of blue rays in the artificial light.

Obviously there are two methods of making artificial light similar to natural light in spectral composition. One method consists of the addition to the artificial light of those rays which are not present in sufficient quantity. In the other method the rays which are in excess are subtracted. This latter method—the subtractive one—is the more convenient to carry out. It may be accomplished, for instance, by passing the artificial light

through a special colored glass which will absorb proper amounts of the rays which are present in excess. The transmission of the absorbing screen should be the reciprocal of the relative brightness of the illuminant and daylight at each part of the spectrum, spectroscopic identity with daylight being the criterion for a color matching light.

On account of the variability of the color of daylight, professional color matchers have been lead to search for the most constant kind of daylight. This they have decided to be the light from a clear north sky. To the eye this is somewhat blue in color, hence the problem of producing daylight is not necessarily the same as that of producing white light.

As a result of considerable research a glass has been produced which will transmit only those color values which in combination will produce an equivalent of the standard daylight sought, a 500 Watt nitrogen-filled lamp being used as a source.

About 80 per cent. of the light is lost in the filtering process, which makes the cost prohibitive for general illumination, but this interferes but little with its use as a special unit to be used in color-matching operations.

George S. Crampton, M.D.,
Clerk.

SEVENTH TRIENNIAL REPORT

OF THE

REPRESENTATIVE OF THE COLLEGE OF PHYSICIANS

ON THE

STATE QUARANTINE BOARD

THE framers of the Act[1] creating the State Quarantine Board of the Commonwealth of Pennsylvania, evidently contemplated a non-partisan body of men whose interest would be solely the welfare of the citizens, and a proper consideration of the maritime interests of the port, in other words a discerning administration of a trust without fear or favor. As a new member who has in no way as yet exerted any influence on the course of events, and who may in a way, therefore, speak as an outsider, I see no evidence of deviation from the course suggested.

The Board consists of the Health Officer of the City of Philadelphia, the Quarantine Physician, the Commissioner of Health, and a representative physician, the four appointments being made by the Governor of the Commonwealth. One member is appointed by the Mayor of the City of Philadelphia, another by the Maritime Exchange. The College of Physicians is represented by the President or by a member of the College designated by that officer; to the latter honor I have fallen heir. It is an honor —I may say a distinguished honor—to strive, even in a feeble, though whole-hearted manner, to represent the College; would I could feel worthy.

On November 19, 1912, came the deplored death of Dr. Richard A. Cleeman, long the respresentative of the College and for many years an influential member of the Board. At the time of his death, Dr. Cleeman was President of the Board. His charming personality, sincere interest in the work, and devotion to duty had won the warm admiration of his colleagues who honored him and themselves by his merited selection to the Presidency.

[1] Pamphlet Laws, Pennsylvania, 1893, p. 295.

Upon the death of Dr. Cleeman, the Board spread on its records the following minute:

"*Be it resolved,* That we, members of the State Quarantine Board note and record with deep sorrow, the death of Dr. Richard A. Cleeman and that the Board shall attend in a body the funeral of our beloved fellow member."

This was no formal idle tribute but the sincere expression of discerning men whose fondness for their deceased colleague found in the brief statement an enduring recognition of their sense of loss profoundly felt by each of them.

My appointment was received on January 21, 1913, and on February 4 I attended the first meeting. The appointment was for an unexpired term ending June 1, 1914. On June 4 of the current year the Secretary of the College advised me of my appointment for the succeeding term ending June 1, 1917, and for the first time I was apprised of the fact that the representative was expected to present at the June meeting of the College, a report covering the three years.

Except in emergencies the work of the Board is largely routine; the members have no onerous duties. Monthly meetings are devoted to considering problems of quarantine, to financial reports covering expenditures and to other details of disbursements of money appropriated by the State.

The details of inspection, disinfection, and other routine are performed by deputies residing at the Quarantine Station at Marcus Hook. The following statistical report covers, in an epitomized form, and correctly presents, a summary of the work done each year:

STATISTICAL REPORT.

	Year ending May 31.			
	1912	1913	1914	Total.
Vessels inspected and passed	1,674	1,696	1,662	5,032
Vessels detained for disinfection, outbound at request of agents, no disease on board	11	0	0	11
Vessels detained for disinfection . . .	0	104	7	111
Passengers inspected and passed . . .	58,697	79,166	81,280	219,143
Officers and men inspected and passed .	60,798	67,551	93,066	221,415
Officers and men detained for observation	0	2	0	2
Persons examined, detained, etc. . . .	119,495	142,723	174,346	436,564
Medical and surgical cases examined .	198	3,052	4,002	7,252

Formally I am not aware that the Board has expressed an opinion as to the adequacy of funds appropriated for the support of the Station. About $30,000 is available annually; much more could be accomplished and the plant owned by the Commonwealth could be better maintained and rendered far more creditable were it possible to secure adequate resources. In 1911, an addition to the barracks was built at a cost of $2315. Facilities are now available for the accommodation of 600 persons. A fumigating plant costing $3305 was also installed and a new bulk-head erected.

On July 1, 1911, occurred the death of Mr. Charles Giller, member appointed to represent the Philadelphia Maritime Exchange. Mr. Richard Watson, an influential member of the organization, was appointed for the unexpired term; Mr. Watson was reappointed for a full term July 1, 1914.

The records show numerous temporary detentions and many disinfections, but for the most part without material interest to the public or to this body. On March 6, 1912, the following action was taken:

"WHEREAS, Cases of contagious diseases not quarantinable are often discovered on ships entering this port, *Resolved*, That an employee of the State Quarantine, accompany such vessels up to the wharf to see that such cases are delivered to the City Authorities."

This action should render possible closer affiliation with and coöperation between State and local authorities, thereby increasing the efficiency of both.

On July 11, 1912, the S. S. Koln came up the river with one case of small-pox on board; 186 persons who had been in contact with the case in any manner were removed from the vessel and held under observation. The vessel was disinfected and allowed to proceed to her wharf. All the suspects with the exception of six were released on July 24. The six were released August 5, no further cases of the disease having developed. Necessary vaccination had been practiced. This is a type of the functions performed by the Station.

On December 4, 1912, Henry M. Dubois, Esq., appointed by His Honor the Mayor, was unanimously chosen President succeeding Dr. Cleeman.

A distinct advance authorized by the Board is embraced in the following from the record under date of February 10, 1913:

"WHEREAS, The Directors of the Maritime Exchange, have requested in writing the State Quarantine Board of Pennsylvania, to grant the United States Public Health Service, the privilege hereafter of making joint inspections of vessels coming up the Delaware River by the physicians of the United States Public Health Service jointly with the physicians of the State Quarantine at its Station at Marcus Hook.

"*Therefore, be it resolved,* That the State Quarantine Board of the State of Pennsylvania, hereby grants unto the United States Public Health Service, the privilege hereafter of making joint inspections of vessels coming up the Delaware River by its physicians with the physician of the State Quarantine of Pennsylvania at the State Quarantine at Marcus Hook, Pa., *Provided,* however, that the same meets with the approval of the Governor of the State of Pennsylvania.

"Governor Tener approved the above and the same went into effect March 18, 1913."

At present harmonious coöperation between national and state services is fully maintained. The shipping interests are relieved of onerous double boarding and consequent delays, and the public adequately protected in every way.

The Board is now constructing a small hospital for the detention of certain cases. The matter was not fully closed at the end of the year; at present it may be regarded as work in progress. The Committee having charge of the addition consists of Dr. Heller, Dr. Dixon, and your representative.

Often your representative feels the need of counsel and hesitates to initiate changes without the formal approval of the College or of some Committee thereof. I venture the suggestion that the Committee on Public Health and Preventive Medicine, or if it be deemed wise a special Committee be designated, with

whom your representative may confer. It is possible that your Committee on Public Health and Preventive Medicine might consent to accept your representative on the State Quarantine Board as a member ex-officio. Either suggestion would, I am sure, be most helpful.

Respectfully submitted,

W. M. L. Coplin,
Representative on State Quarantine Board.

Presented November 4, 1914, as of June 1, 1914.

PRESENTATION OF A PORTRAIT

OF

SIR WILLIAM OSLER, M.D., F.R.S.

Dr. James Tyson presented on behalf of Lady Osler a portrait by John S. Sargeant of her husband, Sir William Osler, with the following brief address:

I feel it a special privilege to be permitted to present on behalf of Lady Osler this portrait of her husband, Sir William Osler, by the distinguished painter John S. Sargeant. I was one of those personally interested in Dr. Osler's call to the position which made him one of us for a time. Previous to his coming we knew little of him personally, his writings having been his chief introduction. He had been a liberal contributor to the *Philadelphia Medical News* and to English and Canadian journals, and many of his papers were characterized by an unusual amount of originality and research which attracted our attention and largely determined the selection. I naturally therefore watched with great satisfaction the rapid evolution of his abilities and of his eminence while Professor of Clinical Medicine at the University and later Professor of Medicine at Johns Hopkins University and Regius Professor of Medicine at Oxford.

The special demands made on our time by the program of the evening make it impossible to devote more than a few minutes to a mention of the qualities of head and heart which have combined to make him professionally distinguished and personally beloved by all who know him in Europe and America. It is commonly conceded that a fundamental condition of success in our profession is a sincere love of it, and its pursuit for the most unselfish and altruisic motives. That such motives were the main-

spring of the choice of a profession by our distinguished non-resident Fellow goes without saying, "Write me as one that loves his fellow man," he says of himself. So it has been written; and the stamp has remained true to its claim.

To these conditions, of course, he added knowledge—"Knowledge that man can use, the only knowledge that has life and growth in it." But more. To such knowledge he also contributed like knowledge, resulting even in his student days in a thesis on Pathological Anatomy, which so attracted the attention of his faculty at McGill that they awarded a special prize for it. His later contributions are attested by his books, monographs, papers, and addresses, of which the list of titles alone occupies six two-columned pages of the Surgeon-General's Catalogue brought down only as far as 1907. On these writings perhaps more than anything else depend his reputation and much of his usefulness, though as a teacher also his reputation preceded him. He was at McGill as Professor of the Institutes of Medicine, a chair which included physiology and pathology. But he was also physician and pathologist to the Montreal General Hospital, and taught in the wards. His Saturday morning demonstrations we are informed by his colleague Shepperd were crowded by practitioners and students alike. But he did more than teach. He also inspired others with the same enthusiasm that characterized himself, whether directed to the study of disease in the laboratory, wards, or autopsy room, whether discoursing from the lecture table or facilitating the coöperation of the different departments of a hospital, with a view to its adaptation to medical teaching and advancing it or to the cure of the sick and wounded.

The young men of our own city who had the privilege of his teaching represent a special class upon whom was impressed a wider conception of the stuy of medicine. He had taught them to see and to observe, and the facts thus acquired were combined to deduce conclusions and diagnoses. Some of these young men he took to "Johns Hopkins" with him, where they became the sturdy graft whence sprouted a band of capable hospital physicians and teachers who are scattered over this country and Canada.

While his sojourn with us was much shorter than that in Baltimore, but five years as compared with sixteen, he found much that was congenial. The traditional and written history of our colonial and early national life appealed to him, while he especially admired the public spirit and ability of the best type of our colonial physicians, many of whom, represented by such men as Morgan, Shippen, Wistar, and Rush, were educated abroad at Edinburgh, London, Paris, and Leyden.

The Pennsylvania Hospital was his especial favorite, and he delighted to dwell on its interesting traditions and history of its origin and the men who had to do with it. The early history of the University similarly interested him.

To this College he has been a watchful friend and benefactor. A member of the Library Committee while with us, he has given us the expert assistance of the bibliophile while his purse has frequently been opened to contribute the price of a costly volume or a share of it jointly with others.

A gentleman of the purest strain, Osler is possessed of a rare personality, itself a passport to the affection and admiration of men. Everywhere bristling with humor and jocosity, there are few of his intimates who have not been victims of them in greater or less degree. A generous hospitality and a hearty welcome to friends and guests complete a memory which will be pleasantly revived whenever we look upon the portrait before us.

On reverse of portrait is the following inscription:

WILLIAM OSLER, M.D., F.R.S.,
REGIUS PROFESSOR OF MEDICINE IN THE
UNIVERSITY OF OXFORD.
DRAWN BY JOHN S. SARGEANT
IN LONDON, FEB., 1914.
PRESENTED TO THE COLLEGE OF PHYSICIANS
OF PHILADELPHIA
BY GRACE REVERE OSLER.

SPECIAL MEETING OF THE COLLEGE OF PHYSICIANS, UPON THE DEATH OF DR. S. WEIR MITCHELL, JANUARY 6, 1914.

DR. JAMES CORNELIUS WILSON, President

This special meeting of the College has been called to commemorate with honor and solemnity the passing away of a Fellow who has long been known not only among us but also throughout the world, in the highest human sense, as a great physician. He was certainly the most accomplished and versatile physician of our times. In science, letters, poetry, history, and every grace of social life he achieved unusual distinction. He served his country and mankind by brilliant original investigations during the Civil War and from his earliest days devoted himself to original scientific research, and by example and suggestion inspired others to engage in similar work.

To a broad patriotism he added an untiring interest in civic affairs, and Philadelphia will miss his wise and unselfish devotion to her welfare. As an educator in the highest sense he stands forth prominently among the Trustees of the University of Pennsylvania and the Directors of the Philadelphia Library Company. But it was as a practitioner of the art of Medicine that he manifested those qualities of mind and heart that enabled him for nearly half a century to command the admiration and affection of grateful patients and appreciative professional colleagues in almost every civilized country. But to us his life has another meaning and the splendid traits of his character a deeper significance. As a Fellow of this College he showed a

steadily progressive interest in its affairs and an ever-increasing liberality of means and energy to promote its welfare. But for his conclilatory spirit, his indomitable will, and his power to influence men, this beautiful hall would still be an unrealized hope. If the world could load him with honors as it did, how much more is it for us to pay the homage of our deep appreciation and reverent affection to the dear colleague whom we have lost by death, Silas Weir Mitchell.

TRIBUTE TO S. WEIR MITCHELL

By W. W. KEEN, M.D.

In this same hall but a short time ago at a memorial meeting in honor of Henry C. Lea, I spoke of our "Philadelphia Triumvirate" of eminent men, Henry C. Lea, Horace Howard Furness, and S. Weir Mitchell. Now the last of this distinguished trio—the most remarkable medical man I have ever known in Europe or America—has passed away.

My first acquaintance with S. Weir Mitchell was in the first week in September, 1860, over fifty-three years ago—a very long time for an intimate friendship unshadowed by the smallest cloud.

I had just begun the study of the bones. Gray's *Anatomy*—then quite a new book—lay before me and in my hands was a skull. The window was open and the hot September sun was shut out by Venetian blinds, as in the early afternoon I sat in my preceptor's office where now the Jefferson Medical College building stands. Suddenly I heard the blinds move and turning around I saw a pair of eyes looking between the now horizontal slats, while a voice outside said, "Doctor, don't you want to help me in some experiments on snakes?" Flattered by a doctorate won by only

three days' study, and ardently desiring to make a more intimate acquaintance with snakes, I instantly assented. On going to the door I saw a slender young man who introduced himself to me as Dr. S. Weir Mitchell. Though only eight years my senior—he was only past thirty-one—as he had been a graduate in medicine for ten years I looked upon him as far above my ignorant youth. Never even to the last have I been able—nor did I wish—to annul the early habit of my youth and regard him as aught else but my medical father—my beloved master.

Soon after the War broke out, when Surgeon General Hammond at Mitchell's suggestion established some special hospitals, including the Hospital for Diseases and Injuries of the Nervous System, I was appointed, at his request, the junior assistant of himself and Morehouse. Years afterward he told me his reason for asking for my appointment—that he had found when I was a student that "he never could kill me with hard work"—a cherished compliment.

In the Christian Street Hospital and later at Turner's Lane Hospital for nearly two years I enjoyed the most intimate daily intercourse with him. Still later in the Orthopedic Hospital I was his surgical colleague; in the College of Physicians his hearty supporter; and always and everywhere his warm friend.

These intimate relations resulted in the closest medical friendship of my life. I owe to him more than to anyone else the path I have trodden, the literary and scientific impulses I have received and any success I may have achieved.

He taught me the important art of elucidating the case histories of patients; the importance of little hints which were often the insignificant surface out-croppings of a rich vein of facts; the importance and methods of cross examination to ferret out the truth, and above all, the ability to interpret these assembled facts in making a diagnosis.

He had a wonderful faculty of correlating widely separated facts and experiences, often, it might be, years apart. To him one plus one did not make two, but resulted in three— a "*tertium quid*"—a new fact or inference.

Never have I known so original, suggestive, and fertile a mind. I often called him a "yeasty" man. His mind was ever fermenting, speculating, alert, and overflowing with ideas. With these he leavened the minds of his fellows and set their ideas fermenting. He was always desirous of putting everything to the test of experiment, and never satisfied until he had exhausted all possibilities. Almost every research but opened a vista of other and still more interesting problems to be solved. An hour in his office set my own mind in a turmoil so that I could hardly sleep. His was indeed an elevating, stimulating friendship. Ideas scintillated, plans were formed, and almost always took concrete shape. He gave points to the botanists, the neurologists, the surgeons, the gynecologists, the psychiatrists, indeed to everybody. *Nihil tetigit quod non ornavit.*

Even to the last, when approaching his eighty-fifth birthday, his mind was as alert and suggestive as ever. But a short month ago, at the dinner given to the Officers and Council of the College of Physicians by the President——a custom he initiated—he made three suggestions which I hope with pious affection we will carry out. (1) That the College of Physicians should publish a "Roll of Honor"—a handsome book containing the many names of the Fellows who have served in the Army, Navy, and Public Health Service, in the War of the Revolution, of 1812, of the Mexican, the Civil, the Spanish-American War, and of the various Indian wars. (2) That we should publish a catalogue raisonné of our splendid collection of incunabula, to which I would add of our specially important and rare books. It would be a notable contribution to medical scholarship and culture. (3) That we should publish each month a Bulletin or "Compte Rendu" including the proceedings of the Sections of the College, with notes on especially important new books, relics, portraits, etc.

Personally to know S. Weir Mitchell was a passport in any gathering, not only of medical men, but of laymen. When it was announced at Harrisburg a year ago that Dr. S. Weir Mitchell had come to oppose a vicious antivivisection bill, the legislators crowded to meet their distinguished visitor.

I well remember when dining with Sir James Paget, who, as President of the International Congress of 1881, over thirty years ago, entertained one hundred guests daily for a week—how pleased I was when that eminent surgeon said to me "Dr. Mitchell is one of the most distinguished medical men in your country," adding after a pause, "or in any country." This opinion was emphasized in the case of more than one American patient who had crossed the Atlantic to consult Paget, by his advising them to return to America and consult S. Weir Mitchell as the highest authority on their troubles.

I must leave to others to speak of him as a novelist, a poet, a patriot, and a citizen, of his own original researches and of his services to medical education, but must confine my remarks especially to his services to our own Institution.

His services to this College can never be overestimated. Twice president of the College—an honor conferred upon only one other of our Fellows in one hundred and twenty-seven years—his friend Dr. J. M. DaCosta—his life was closely identified with its history for fifty-eight years, a period antedating the birth of most of the Fellows of the College. The College was an ever-present object of solicitude. He was continually giving books, curios, paintings, relics, and other riches to our collections, and also stimulating others to join him in presenting valuable gifts.

In the days of doubt and apprehension, when we were debating the question of removal from Thirteenth and Locust Streests, his wise foresight, happy optimism, persistent and wonderful success in raising funds for what seemed at times an almost hopeless scheme, encouraged even the most doubtful, and finally won the day. This vision of splendor—it is not too strong a phrase for the finest home of any medical society in the world—we owe to him. Appropriate indeed is Wren's epitaph in St. Paul's, "*Si Monumentum quaeris Circumspice.*"

The gifts in busts, statues, rare books, portraits, and splendid additional endowments that have been showered upon us since we dedicated this Hall witness his far-seeing wisdom.

Of honors he received his rightful share. To say nothing of the recognition of his worth by many American universities and learned societies, Bologna, oldest of all universities, at the celebration of the eight-hundredth anniversary of its foundation, gave him an honorary M.D. Edinburgh gave him its imprimatur with an LL.D., and he was elected a Foreign Associate of the French Academy of Medicine, of the Royal Society, and of many other foreign societies.

Very rarely, but then with earnestness, has he spoken to me of his spiritual life, but on these few occasions he has expressed a devout belief in the Christian religion and wondered that men could live without deep religious convictions. Among his most cherished friends were Bishop Phillips Brooks, Bishop William N. McVickar, and Rev. Dr. Charles D. Cooper.

But he has gone to his eternal rest and reward. Happily even at such advanced age, while his bodily faculties were gradually failing, his mind was as alert, vigorous, and inquisitive as ever. He has sunk to rest like an unclouded sun in full-orbed splendor. *Requiescat in pace.*

TRIBUTE TO S. WEIR MITCHELL

By JAMES TYSON, M.D.

Mr. President and Fellows of the College:

With Dr. Mitchell's death closes a career characterized alike by brilliancy and usefulness. He was at once physician and contributor to our knowledge of disease and its treatment, a scientist, a skilled writer in prose and verse, and a public benefactor. This meeting of the College of Physicians is called that we may give expression to our esteem, our sorrow, and our gratitude for the part he has taken in placing the College on that

high plane of dignity and usefulness everywhere acknowledged of it, and for what he has done in securing its material prosperity.

Doubtless there will be arranged in the near future a memorial meeting for which suitable speakers will be selected who will enlarge on the life and work of this great man; so that I will occupy only a few minutes of your time in pointing out more particularly those services which have resulted in associating his name, more closely than that of any other man, with the history of the College.

Dr. Mitchell became a Fellow of the College in 1856, and at the time of his death was the third on our roll of membership. He was elected during the period when the College met in the "Picture House" on the grounds of the Pennsylvania Hospital, built for the lodgment and display of Benjamin West's great picture of "Christ Healing the Sick," in what I have called elsewhere the *fourth home* of the College. He often alluded humorously to the difficulty he had in securing election on account of the school prejudices of the day.

His activity began with the more rapid growth of the library which started with the generous gift of Dr. Samuel W. Lewis in 1864. His first substantial contribution was the establishment in 1880 of the Weir Mitchell Library fund, endowed with $1000, which he subsequently increased to $5000. This gift was followed by another in 1883, of $5000, subsequently increased to $7000, to provide an Entertainment Fund whence the Fellows could be entertained at such times as the accumulated interest might justify.

The Directory of Nurses, which has been one of the benefactions of the College, he established in 1882. It has become a source of considerable revenue to the College as well as a boon to the community.

Dr. Mitchell became the President of the College in 1886 and was reëlected in two successive years, and again in 1892, with like reëlections in 1893 and 1894. These administrations were characterized by untiring efforts of the President to advance the

interests of the College in many ways. The most striking of these was the continued rapid growth of the library as shown in the gifts of books and numerous subscriptions for their purchase.

The culminating act of Dr. Mitchell's relation to the College of Physicians was the erection of the palatial new College Hall which we now occupy. Its cost in round numbers, for lots and buildings, was $365,000, and it is safe to say it would not have been accomplished for many years, if at all, but for his influence and assistance. In addition to his own handsome subscription he was instrumental in securing very large sums from others, such as $100,000 from a single person, $75,000 from another, $20,000 from another, and from others smaller but still large sums.

But more than this, Dr. Mitchell gave *himself* to the College. He gave of his hopefulness, of his courage and enthusiasm, of his time as well as his money. He might well have said of himself, as did Sir Jonathan Hutchinson, that he was "a man of hope and forward-looking mind." The College Hall is at once a product of such a mind and a monument to it. In scores of instances, during and outside his administrations as president, he aided the College in the acquirement of rare and valuable books and curios, adding greatly to the value of the Library and Museum. Let us pray that we may inherit the undying spark with which to continue the work he has commenced in so many lines.

With one practice which characterized Dr. Mitchell I am inclined to think few are familiar, because his refinement and thoroughly patrician instincts would naturally lead him to conceal it. I refer to the practice of rendering financial assistance to younger men in their struggles for success in early professional life. This he would do either by direct loan of money, unsolicited though it might be, or by sums advanced to assist in research and experiment or in compensation for literary work or professional assistance. He was indeed one who did not let his left hand know what his right did. The following lines published in a recent issue of one of our daily papers, entitled "An Apprecia-

tion," so accurately reflect the truth that I take the liberty of quoting them in conclusion:

"Whoso are great all hail him great,
And honor him as best they may,
Each in his own appointed way.
But they who judge of height from height
Can never have so sheer delight,
So true a measure of his worth,
As those of lesser birth;
Who, looking upward, feel his smile,
And knowing, too, the while
How far he has to stoop
To be so passing kind."

TRIBUTE TO S. WEIR MITCHELL

By G. E. de SCHWEINITZ, M.D.

Mr. President and Fellows of the College:

At one time or another each member of this collegiate body must have thought of the great emptiness Dr. Mitchell would leave when he went away from us. Now we are looking into it. This is the present vision of our eyes, and there is no tone deep enough for regret, no word fine enough to beguile us from the grief of our loss. And yet, keen though our sorrow is, we hold fast to, and make record of, a solemn pride which is our sustaining right in that with honors thick upon him, with the result of his achievements named and famed throughout the world, this our beloved College of Physicians was ever the favorite object of his heart. Of the love with which he cherished it, of the thought he gave to it, of the labor he bestowed upon it, we know, and we, the Fellows of the College, are the beneficiaries of the full-measured effort he brought to it. The last words he spoke in the Hall were a plea for still further widening our ever-increasing sphere of usefulness and ours must be the sacred privilege to do

those things which he would have done had he been spared longer to live and work with us. On some other occasion full record will be made of Dr. Mitchell's worth and work; how he lighted the lamp of his genius and became the salvor of the nervous wreck, how he mended the wear and tear of the overworked human machine, how he elaborated a method of treatment world-wide in its beneficial results, how he studied and solved the problems of experimental science; how he sweetened the lives of those once bitter with the sorrow of mental and of physical ills, how his songs have flowed through many a heart, how his books have brightened the hours of those who read. But let that biographer tell also of the warmth of his friendship, of the stimulus of his example, of the wealth of his suggestions, of the never-failing kindness of his active interest. Let him tell what he did for the young men of our profession; how the wisdom of his advice smoothed away the ignorance of inexperience; how he steadied feet stumbling along the path of early endeavor; how he started men, young men, and guided them on the sure road which leads to honorable usefulness; and how he did all these things with a fine generosity that it is a joy to remember and a privilege to record.

Mr. President, the College has lost its most loved and distinguished Fellow; it can never lose the inspiration of his splendid presence, nor the favor of his example. These are, and must always remain, our most treasured possessions.

TRIBUTE TO S. WEIR MITCHELL

By FREDERICK P. HENRY, M.D.

I HAVE been requested by the President to prepare a minute expressive of the deep feeling of bereavement which is shared by every Fellow of the College, and respectfully submit the following:

We are met to honor the memory of the most remarkable man in the medical history of this country. We have had many illustrious men in our profession, and the race is by no means extinct, but I have no fear that my statement will be challenged nor that it would be if I included in it the medical profession of the world.

I will not compare Weir Mitchell with other great men, for it is not by comparison that we form our estimate of an individual. I will simply mention a few facts in his remarkable career with some of which all present are probably familiar, but with all of which few, if any, are.

Although never occupying a Chair in any medical school, Dr. Mitchell was, through his writings and his active participation in the proceedings of medical societies, the teacher of those who taught. He was a pioneer in the sciences of experimental physiology and neurology. I was familiar with his name as an authority in medicine when I was a medical student, and I was graduated in 1868. His life was a complete refutation of the fallacy that there is any time-limit to a man's capacity for original work. In his eighty-fifth year he added another to his long list of successful novels, successful in the highest sense of the word, for they have secured a permanent place in English literature.

In his numerous and varied activities he represented the spirit of the age, but he would have represented the spirit of any age in which he might have lived. In the days which we, in our self-sufficiency, regard as primitive, days when poetry and philosophy and sculpture and architecture attained a degree of perfection that has never been surpassed or even equalled, Weir Mitchell might have had a place in the Pantheon, for the qualities which compelled the admiration and respect of this generation were the very ones whose possessors were deified by Greece and Rome. By giving a legitimate scope to our imagination we can think of him as a disciple of Esculapius, who rivalled his master and was accorded equal honor with him, and in that imaginary event, we can fancy the noble statue of Esculapius which adorns our Hall replaced by the equally noble figure of Weir Mitchell. It is far better as it is, far better for us who have felt the direct

influence of his quickening spirit, and, awakening from our dream, we may thank God that he lived in our day and generation, and that his works are not among our incunabula.

I am oppressed by the thought that the noble countenance with which we were all so familiar is now but a memory; that I shall no more sit with him at the meetings of the Library Committee, where we delighted to do him honor, where we strove to anticipate his wishes, and where his suggestions were our commands.

Although his face is but a memory and his voice no longer heard, his spirit is still with us and will remain so long as we maintain the traditions he revered and which have as their basis the virtues of honesty, justice, and truth. These formed the substratum of his own character, and the graces of gentleness, sympathy, and tact, which were so conspicuous in its superstructure, derived their convincing force from the solid foundation on which they rested.

APPENDIX

ANNUAL REPORT OF THE LIBRARY COMMITTEE FOR 1914

Mr. President: In accordance with the ordinances and By-Laws of the College, I herewith submit the following report of the Library Committee for the year 1914:

Total number of volumes in the Library, including the bound volumes and 10,064 unbound "Reports" and "Transactions"	105,540
Number of unbound "Theses" and "Dissertations" .	12,889
Number of unbound pamphlets	85,142

Included in the above total there are 3,284 volumes known as "reserves," consisting of second copies of some of the more important periodical publications, and 3,026 volumes more or less incomplete.

The duplicates, which are not included in the above total, number 5,002.

The following table shows the number of volumes in the various divisions of the Library:

	Bound.	Incomplete and unbound.	Total.
General Library . . .	75,113	2,979	78,092
Lewis Library	13,575	44	13,619
On permanent deposit:			
S. D. Gross Library . .	3,545	3	3,548
Library of the Obstetrical Society of Philadelphia .	217	. .	217
			95,476

The Library has received from all sources, during the past year, 3,977 volumes, 11,587 pamphlets, and 21,158 numbers of

various periodicals. Of these 372 volumes and 18 pamphlets were received in exchange.

Accessions (including 200 volumes "reserves"):	
General Library	2,929
Lewis Library	13
S. D. Gross Library	20
	2,962

Photographs received in response to requests sent out during the past year:

Foreign, 86. Fellows of the College, 24.

The individual "donors" for the year ending November 1, 1914, number 482; this represents 893 distinct presentations. Each gift is duly acknowledged and properly recorded.

The following list shows the donations of twenty-five volumes or more; the number of volumes presented by the various publishing houses; and the gifts of the Philadelphia Pediatric Society:

	Volumes.
Dr. Edward P. Davis	211
Dr. George McClellan	135
Dr. Richard S. Hooker	104
Dr. Charles S. Turnbull	89
Dr. W. Wayne Ashhurst	84
Mrs. Thomas S. Kirkbride	67
Dr. Astley P. C. Ashhurst	62
Dr. R. H. D. Swing	60
Dr. Hobart A. Hare	57
Dr. James E. Talley	49
Dr. L. F. Lautenbach	45
Philadelphia Department Health	38
Mr. Montgomery Harris	37
Dr. John B. Roberts	36
Dr. William W. Keen	29
Dr. David Riesman	27
Dr. F. M. Strouse	27
Dr. S. Weir Mitchell	25

From the publishing houses of:

P. Blakiston's Son & Co.	26
F. A. Davis Company	10
Lea & Febiger	7
Lemcke & Buechner	4
J. B. Lippincott Company	23
W. B. Saunders Company	36
William Wood & Company	6

From the Philadelphia Pediatric Society: 2 volumes.

The Library is indebted for large gifts of pamphlets and unbound periodicals to the following donors:

Dr. Lewis H. Adler, Jr.
Dr. Oscar H. Allis
Dr. Herman B. Allyn
Dr. Astley P. C. Ashhurst
Dr. John Aulde
P. Blakiston's Son & Co.
Dr. E. J. G. Beardsley
Dr. Henry W. Cattell
Dr. Burton Chance
Dr. S. Solis Cohen
Dr. John M. Cruice
Dr. Edward P. Davis
Dr. G. G. Davis
Dr. A. A. Eshner
Dr. Thomas H. Fenton
Dr. Lawrence F. Flick
Dr. Charles H. Frazier
Dr. Joseph S. Gibb
Dr. John C. Gittings
Dr. J. P. Crozer Griffith
Dr. S. McC. Hamill
Dr. Hobart A. Hare
Mr. Montgomery Harris
Dr. Charles J. Hatfield
Dr. Frederick P. Henry
Dr. J. Norman Henry
Dr. A. Bern Hirsh
Dr. William W. Keen
Dr. Fred Harlen Klaer
Dr. John A. Kolmer
Dr. R. G. LeConte
The J. B. Lippincott Co.
Dr. George McClellan
Dr. Edward Martin
Dr. Charles K. Mills
Dr. John K. Mitchell
Dr. S. Weir Mitchell
Dr. George W. Norris
Dr. Francis D. Patterson
Dr. David Riesman
Dr. John B. Roberts
Dr. George G. Ross
The W. B. Saunders Co.
Dr. Albert C. Sautter
Dr. George E. de Schweinitz
Dr. B. Schwartz
Dr. Charles F. Taylor
Dr. William J. Taylor
Dr. C. S. Turnbull
Dr. Henry R. Wharton
Dr. J. William White
Dr. James C. Wilson
Dr. C. S. Witherstine
Dr. George B. Wood
Dr. Horatio C. Wood
Dr. M. W. Zimmermann

797 new publications were added to the Library during the past year; 56 of these works were written or edited by Fellows of the College.

41 volumes were presented by the following authors or editors:

Dr. A. P. C. Ashhurst
Dr. A. P. C. Ashhurst (editor)
Dr. H. Byrd
Dr. A. Ciampolini
Dr. F. C. Daniel
Dr. Warren B. Davis
Mr. Henry J. Fuller
Dr. R. Galeazzi
Dr. E. H. Goodman
Dr. Alfred Gordon
Dr. H. A. Hare
Dr. H. A. Hare (editor)
Dr. Guy Hinsdale
Dr. Daniel M. Hoyt
Dr. Jamieson B. Hurry
Dr. Edward Jackson (editor)
Dr. Morris Jastrow
Dr. Frank C. Knowles
Dr. Thomas McCrae
Dr. Charles H. May
Dr. J. Ewing Mears
Dr. S. Weir Mitchell
Dr. W. S. Newcomet
Dr. George W. Norris
Dr. R. M. Pearce
Mr. E. B. Phelps
Miss Gertrude Rand
Dr. T. E. Satterthwaite
Mr. Edward Trust (compiler)
Dr. G. Vicarelli
Dr. William Zentmayer (editor)

22 volumes were sent by the publishers at the request of the following authors or editors:

Dr. James M. Anders
Dr. H. W. Cattell (editor)
Dr. J. Chalmers Da Costa
Dr. Edward P. Davis
Dr. G. G. Davis
Dr. John B. Deaver
Dr. M. H. Fussell
Dr. Fielding H. Garrison
Dr. R. M. Goepp
Dr. William W. Keen
Dr. Joseph McFarland
Dr. Charles E. de M. Sajous
Dr. Jay F. Schamberg
Dr. Henry W. Stelwagon
Dr. James Thorington
Dr. James Tyson
Dr. H. G. Wells
Dr. William H. Wells

Summary of the Funds:

	Volumes purchased.	Cost.
Henrietta Rush Fales Baker Fund	57	$169.90
Luther S. Bent Fund	19	37.86
William T. Carter Fund	56	167.79
Gerardus Clarkson Fund	16	49.28
Francis X. Dercum Fund	54	210.83
Louis A. Duhring Fund	4	21.12
John D. Griscom Fund	58	218.14
William F. Jenks Fund	57	219.69
Oliver A. Judson Fund	15	62.20
William V. and John M. Keating Fund	7	30.91
William W. Keen Fund	10	40.87
Library Endowment Fund	155	700.46
Horace Magee Memorial Fund	19	132.47
J. Ewing Mears Fund	40	115.74
Charles K. Mills Fund	2	11.31
Weir Mitchell Fund	45	178.10
John H. Musser Fund	11	27.42
Elizabeth K. Newcomet Fund	27	61.01
William F. Norris Fund	34	131.73
Charles A. Oliver Fund	3	12.77
Philadelphia Medical Society Fund	9	18.79
Lewis Rodman Fund	45	160.71
Douglas Stockton Warren Fund	35	104.42
John F. Weightman Fund	5	27.33
Caspar Wistar Fund	72	142.36
	855	$3,053.21

Special Accounts:

	Volumes purchased.	Cost.
Fund for completing files of journals	199	$618.94
Fund for rare and valuable books	6	217.28
Journal Association	13	71.90
New Book Fund	29	92.48
S. D. Gross Library Account	18	177.21
	265	$1,177.81

George B. Wood Fund for Library supplies, stationery, etc. Expended, $446.07.

There were 1,813 volumes bound during the past year. This includes all new unbound books and current periodicals.

	1914.	1913.	Increase.
Number of visitors to the Library .	8469	8272	197
			Decrease.
Fellows of the College	3818	3952	134

The Library has been kept open two evenings each week and on the six minor legal holidays, for the same hours and period of time as during the preceding year:

	1914 (78 evenings).	1913 (76 evenings).	Decrease.
Visitors, evening	462	573	111
Fellows of the College	145	204	59
			Increase.
Visitors, legal holidays	154	152	2
Fellows of the College	49	40	9

The above figures are included in the total number of visitors for the year.

	1914.	1913.	Decrease.
Number of books consulted in the Library	24,000	24,430	430

The number of books reported as "consulted in the Library" includes only those supplied by the Librarian or his assistants. Readers have access to the bound volumes kept on the shelves in the "Reading-room," and the Fellows of the College have access to the "Book-stacks." There are, therefore, a great many volumes consulted of which no accurate record can be kept.

	1914.	1913.	Decrease.
Number of books taken out. . . .	4301	4483	182
	Works.	Volumes.	Cards written.
Cataloguing	1111	1167	11,240

All the books added to the shelves during the past year and 123 of the more important pamphlets have been catalogued, and each volume has been accessioned and shelf-listed.

9,232 unbound pamphlets and reprints have been subject-

headed and arranged alphabetically by subject, and by author under the subject.

Revision of catalogue: Number of cards revised, typewritten, examined, and alphabeted for the year ending November 1, 1914: 9,658. The revision of the catalogue has been completed as far as the subject "Trypsin" in the second series of the "Index-Catalogue."

6,087 shelf-list cards have been revised and typewritten (in addition to the current work). This completes the revision of the shelf list.

The current periodical publications, including "Transactions" and "Reports," received as issued, at this time are obtained through the following sources:

	American.	Foreign.
Henrietta Rush Fales Baker Fund	0	13
Dr. Albert P. Brubaker	1	0
William T. Carter Fund	2	12
Francis X. Dercum Fund	0	12
John D. Griscom Fund	2	34
Samuel D. Gross Library Account	0	3
William F. Jenks Fund	2	16
Journal Association	1	8
Oliver A. Judson Fund	0	7
William V. and John M. Keating Fund	0	7
William W. Keen Fund	2	10
Library Endowment Fund	4	108
J. Ewing Mears Fund	0	2
Weir Mitchell Fund	1	29
Elizabeth K. Newcomet Fund	0	1
William F. Norris Fund	1	9
Philadelphia Medical Society Fund	0	7
Lewis Rodman Fund	0	13
John F. Weightman Fund	0	4
Caspar Wistar Fund	1	9
By Purchase, General Account	28	330
In Exchange	91	88
Editors	120	21
Publishers	47	1
	303	744

	American.	Foreign.
Brought forward:	303	744
In addition, current numbers of periodicals are received, at stated intervals, through the courtesy of the editors and editorial staff of the following journals: American Journal of the Medical Sciences; Medical World; Therapeutic Gazette	149	58
	452	802

Total number of periodicals received at this date, 1,254.

New subscriptions added during the past year: American, 15; foreign, 40. Total, 55.

We exchange publications with the following schools of medicine:

University of Amsterdam.
" Basel.
" Berlin.
" Bern.
" Bonn.
" Breslau.
" Erlangen.
" Geneva.
" Giessen.
" Göttingen.
" Griefswald.
" Halle.
" Heidelberg.
" Kiel.
University of Königsberg.
" Lausanne.
" Leiden.
" Leipzig.
" Liège.
" Lund.
" Marburg.
" Rostock.
" Strassburg.
" Upsala.
" Utrecht.
" Würzburg.
" Zurich.
Faculty of Medicine of Bruxelles.
" " Paris.
" " Toulouse.
" " Yucatan.

The University of Liège and the University of Utrecht have been added to the list during the past year.

1,662 dissertations have been added to the Library during the year, in addition to the Paris theses, which are collected and bound by our agent in Paris, before being delivered.

We have received for the current year ending November 1, 1914, $355.66 in cash from the sale of duplicates.

We have an exchange, arranged on a cash basis, with two New York dealers; and have received during the past year books and journals valued at $62.35, and have a balance to our credit of $93.62.

During the year we have distributed duplicate books and journals on exchange account to the following:

Boston Medical Library Association.
Denver Medical Library.
Medical Library Association.
Medical Library, New York State Library.
Pittsburgh Academy of Medicine.

Returns have been received from the Boston Medical Library Association, Denver Medical Library, the Medical Library Association and the Library of the Surgeon-General's Office. With the aid of exchanges, and by purchase from funds appropriated for the purpose by tbe Library Committee we have, since November 1, 1913, completed our files of the following journals:

Anatomische Hefte. Wiesbaden.
Archives Internationales de Physiologie. Liège and Paris.
Archivos de Oftalmologia Hispano-Americanos. Madrid and Barcelona.
Journal of Ophthalmology, Otology, and Laryngology. New York and Lancaster, Pa.
Klinische Monatsblätter für Augenheilkunde. Erlangen and Stuttgart.
Ophthalmologische Klinik. Stuttgart.
Paris Chirurgical. Paris.
Il Policlinico. Roma.
Skandinavisches Archiv für Physiologie. Leipzig.
Therapeutisches Jahrbuch. Wein.
Therapie der Gegenwart. Wien.

Amount of fines collected from November 1, 1913, to November 1, 1914, $26.50.

The following is a list of the rare medical books and works of special interest received during the past year:

Incunabula

(Total number of incunabula at this date, 176)

Albertus Magnus. (Summa de quatuor coævis et de homine.) Venetiis, Simon de Luere, 1498. A remarkably well-preserved copy in perfect condition, from the famous "Strozzi" Library. (Presented by Dr. Richard H. Harte.)

Plinius, Cajus Secundus. (Historia naturalis.) Historia naturale di C. Plinio secondo tradocta di lingua Latina in Fiorentina per Christophoro Landino Fiorentino. Venetiis, Nicolaus Janson Gallicus, 1476. A superb copy. Believed to be the first Italian edition of any classic. (Presented by Henry Reed Hatfield, Esq.)

Works of Special Interest

Ayrer, G. H. Commentatio iuris ecclesiastici de iure dispensandi circa connubia. Gottingae, Regiae Univ. off. librar., 1742. (Presented by Dr. Thomas Biddle.)

Briggs, Gulielmus. Ophthalmo-graphia, sive oculi ejusque partium descriptio anatomica. Lugduni Batavorum, 1686. (Presented by Dr. S. Weir Mitchell.)

Chamberlen, Peter. Vindication of publick artificiall baths and bath-stoves. London, 1648. (Presented by Dr. S. Weir Mitchell.)

Chesneau, Nicolas. Observationum medicarum libri quinque. Lugduni Batavorum, Haak, 1719. (By purchase.)

Faber, A. O. De auro potabili medicinali. (London), Faber, 1677. (Fund for rare books.)

Fuller, Henry J. "Old Q" and the apothecary, being a record of a famous trial. (London, privately printed), 1913. (Presented by the author.)

Glauber, J. R. Pharmacopoeae spagyricae. Amstelodami, Janssonium, 1657. (Fund for rare books.)

Harvey, William. Exercitationes de generatione animalium. Londini, Pulleyn, 1651. First edition. A presentation copy from Harvey to Francis Bernard. This work was specially bound for Dr. Mitchell by Emily Tuckerman, with an impression of the Harvey "Stemma" on the sides. (Presented by Dr. John K. Mitchell.)

Hippocrates. Aphorisms of Hippocrates and the sentences of Celsus. Second edition corrected * * * by Sir Conrad Sprengell. London, Wilkin, 1735. (Fund for rare books.)

Letters and memoranda relating to William Harvey. (Bequeathed by Dr. S. Weir Mitchell.)

Mitchell, S. Weir. List of medical cadets in service during the War of the Rebellion. (Philadelphia, 1913). (Typewritten.) (Presented by Dr. S. Weir Mitchell.)

Pamphlets relating to William Harvey, with manuscript notes by W. J. Harvey. (Bequeathed by Dr. S. Weir Mitchell.)

Pemell, Robert. De morbis puerorum, a treatise of the diseases of children. London, Stephens, 1653. (Fund for rare books.)

Perry, Charles. View of the Levant, particularly of Constantinople, Syria, Egypt, and Greece. London, Woodward, 1743. (By purchase.)

de Vigo, Joannes. Most excellent workes of chirurgerye made and set forth by maister John Vigon. (London), Whytchurch, 1543. (Fund for rare books.)

Vesalius, Andreas. De humani corporis fabrica librorum epitome. Basileae, Oporini, 1543. This work is extremely rare. It was issued unbound, and, in consequence, perfect copies are seldom found. The present copy lacks three leaves—C, G, and L. (Presented by Dr. Harvey Cushing.)

Manuscripts

Finch, Heneage (Earl of Nottinham). Commonplace book. (London), 1647. An extremely precious book. Contains some odd notes and memoranda by Finch and others; but its great value consists in having two pages, 582 and 583, the contents of which are written and signed by William Harvey for his nephew and patient Heneage Finch, about 1647. Nowhere, it is said, outside of the British Museum, can so much of Harvey's writing be found. (Bequeathed by Dr. S. Weir Mitchell.)

Other Interesting Additions

American Medical Association. Four badges. (Presented by Mr. Charles Perry Fisher.)

Barton, John Rhea. Marble bust by P. Romanelli. (Presented by Mrs. John Astor and Mrs. Francis C. Lawrance.

Harvey, William. Cup and saucer with the Harvey arms, from the Harvey mansion, Essex, England. (Presented by Dr. John K. Mitchell.)

Hunter, Charles T. Portrait in oils by Rittenberg. (Presented by Mrs. Elizabeth R. Moulton.)

International Medical Congress. Badge of the Ninth Meeting. (Presented by Mr. Charles Perry Fisher.)

McClellan, George. Portrait in oils by Julian Story. (Presented by Mrs. George McClellan.

Morton, Thomas G. Portrait in oils by H. H. Breckinbridge. (Presented by Mr. Arthur V. Morton.)

Osler, Sir William, Bart. A signed sketch by Sargent. (Presented by Lady Osler.)

Storer, Horatio R. Bronze medal designed by R. Tait McKenzie, M.D. (Presented by Dr. Henry Barton Jacobs.)

Turner's Lane Hospital, Philadelphia. Four photographs, framed. (Presented by Dr. John K. Mitchell.)

Yale University Medical School. Badge with bronze medal, commemorating the centennial of its foundation. (Presented by Dr. William W. Keen.)

In last year's report mention was made of the marked increase in the number of visitors, in the number of books consulted in the Library, and in the number of volumes taken out; the largest number, in each instance, since the College has occupied its present building. This year, while there is some increase in the total number of visitors, the other figures are slightly lower than those for 1913; they are, however, much greater, in each division, than for any year in this building previous to 1913. The evening hours show a decrease (111) in the number of visitors recorded, and the average attendance of the Fellows of the College is considerably lower than for the previous year ($1\frac{86}{100}$ against $2\frac{66}{100}$). The "Study-rooms" have been in constant use throughout the year, the average number of volumes called for and retained in these rooms being about 166—an increase of some $52\frac{1}{2}$ per cent.

We lost, by resignation, both our cataloguer and assistant cataloguer in the early part of the current year. We were fortunate in obtaining the services, after a short interval, of a trained cataloguer and an assistant with some experience; in each case, however, without knowledge of medical library work. Their efficiency has been shown by the short time required to obtain a working knowledge of medical terms and medical subject-headings, and the work in this department is progressing satisfactorily.

The war in Europe has affected the Library to some extent in the number of new publications added during the year, and in the regular receipt of current periodicals. Some 300 subscriptions were interrupted, the majority of which (206) were German; these are coming with more regularity at this time. From the present outlook it seems probable that we will feel the effects of this great disturbance more seriously during the ensuing year. Our agents have been able to give but little information; it seems

that no decision has been reached by the foreign publishers, and no statement has been made whether they will allow credit for numbers of periodicals not published, on which subscriptions have been paid in advance, or whether they will extend the subscriptions. While the publication of both French and German journals has been more or less interfered with, at this writing the French seem the more seriously affected. It seems practically certain that a majority of the schools of medicine, with which we exchange publications, will not distribute their theses or dissertations in the near future. Naturally, fewer medical books will be issued, which may be considered a blessing or a calamity, as one views the subject; but, in either case, this stoppage in the accustomed issue of books and journals will lower the report of the number of volumes added to the Library during 1915. Indirectly the Library has suffered the loss, or probable loss, this year, of some additions to its collection of "Incunabula" and rare medical works, as the gift of Fellows of the College who were in Europe, or intended to visit Europe, this past summer.

During the past year the "Library Endowment Funds" have been increased by the Horace Magee Memorial Fund, $15,000; by an additional $2,000 to the J. Ewing Mears Fund; and by an additional $87.39 to the William F. Norris Fund.

Total amount of the Library Endowment Funds	$105,710.13
Income from Funds for the past year . . .	4,305.24

Respectfully submitted,

William J. Taylor,

Chairman.

REPORT OF THE COMMITTEE ON THE MÜTTER MUSEUM

The Committee on Mütter Museum begs leave to offer the following annual report:

Your Committee points with pride to the increased use of its museum during the past year.

On a number of occasions Fellows of the College have visited the Museum with their students for purposes of instruction.

There have also been numerous visits to the Museum by Fellows of the College, as well as by other members of the profession and laity residing in this Commonwealth and in various parts of this, and of foreign countries.

A number of valuable specimens have been donated to the Museum and reported from time to time to the College, among which, on account of its great historic value and interest, the Committee wishes especially to call attention to portions of the skeleton of a rattlesnake, presented by Dr. W. W. Keen, which was used in the experiments made by Drs. S. Wier Mitchell and W. W. Keen in their studies on Rattlesnake virus in 1856.

The committee requests that any Fellow knowing of specimens or collections which could be advantageously added to the Museum by donation or purchase, will call them to their attention.

The committee has been in consultation with representatives from other museums, and has had plans and specifications drawn up by several firms, with a view to the better utilization of space and to the more advantageous display of the collections of the museum. It has in view the adoption of a comprehensive plan, making gradual changes and additions as the funds at its disposal will permit.

The attention of the Fellows is called the lecture to be delivered in Thomson Hall, on Friday, December 4, at 8 P.M., by Dr. Fred. H. Albee, of New York City, the Mütter Lecturer for 1914, on "The Fundamental Principles Involved in the Use of the Bone Graft in Surgery," which it is confidently expected will be as largely attended as was the Mütter Lecture of 1913.

Henry Morris,
Chairman.

REPORT OF THE SECTION ON OPHTHALMOLOGY

Membership, 40.

The Section held seven meetings, which were attended by an average of 17 Fellows and 16 guests.

Fifty-six papers and case reports were read and 36 patients were exhibited.

Four new instruments were shown.

List of Papers

December 18, 1913

Dr. Edward A. Shumway: An Unusual Case of Xerophthalmus.

Dr. William Zentmayer: Congenital Atrophy of the Iris.

Dr. George H. Cross (by invitation): A Scleral Trephine with Revolving Top.

Dr. S. Lewis Ziegler: An Improved Scleral Trephine.

Dr. S. Lewis Ziegler: The Elliot Operation in Glaucoma.

Dr. Edward A. Shumway: Elliot Operation for Chronic Glaucoma.

Dr. S. W. Marshall (by invitation): Elliot Operation for Chronic Glaucoma.

Dr. George S. Crampton: Elliot Operation in Glaucoma.

Dr. Howard F. Hansell: Delayed Reformation of Anterior Chamber after Elliot Operation for Glaucoma.

Dr. G. Oram Ring: Sarcoma of the Choroid in the First Stage.

Dr. George S. Crampton: Adenocarcinoma of Lacrimal Gland.

Dr. George S. Crampton: Incipient Striped Detachment of the Retina Associated with Sinus Disease.

January 15, 1914

Dr. George Strawbridge: Some Remarks on the Early History of Ophthalmology in Philadelphia and Abroad.

Dr. J. Hiland Dewey: Albuminuric Retinitis Subsequent to Decapsulation of the Kidney.

Dr. S. Lewis Ziegler: A Case of Multiple Tubercles of the Iris.

Dr. Thomas B. Holloway: Contusion of the Globe with Penetration of the Orbit by a B. B. Shot.

February 19, 1914

Dr. Howard F. Hansell: Tubercular Keratitis.

Dr. Leighton F. Appleman: Ectropion of the Eyelids Corrected by Skin Grafts.

Dr. Frederick Krauss: Pseudoglioma Following Traumatism.

Dr. Frederick Krauss: Unilateral Optic Atrophy due to Pituitary Growth.

Dr. George E. de Schweinitz: Some Remarks of Ocular Decompression.

March 19, 1914

Dr. William T. Shoemaker: A Case of Tuberculosis of the Conjunctiva.

Dr. Thomas B. Halloway: A Case of Tower Skull.

Dr. George E. de Schweinitz: Some Types of Marginal Keratitis and their Etiology.

Dr. George S. Crampton: A Case of Sarcoma of the Choroid.

Dr. George S. Crampton: A Case of Massive Exudate in Hyaloid Canal following Traumatism.

Dr. George S. Crampton: A Case of Extensive Coloboma Surrounding the Optic Nerve with Retained Hyaloid Artery Joining Nerve and Lens.

Dr. William Zentmayer: A Case of Sympathetic Ophthalmia.

Dr. Wm. Campbell Posey: Eye Injury following Explosion of Golf Ball.

April 16, 1914

Dr. William Zentmayer: Associated Contraction of Frontalis with the Lateral Movements of the Globes.

Dr. Mary Buchanan (by invitation): A Case of Coloboma of the Eyelid.

Dr. Howard F. Hansell: Three Cases of Acute, Double Optic Nerve Atrophy.

Dr. Thomas B. Halloway: A Case of Sclerosis of Choroidal Vessels with Atrophy of the Choroid and Secondary Retinal Involvement.

Dr. Burton Chance: A Case of Coloboma of the Optic Nerve.

Dr. Charles R. Heed: A Case of Rupture of the Choroid.

Dr. G. Oram Ring: A Case of Rupture at the Corneo-scleral Junction due to Traumatism.

Dr. George S. Crampton: A Case of Tubercular Sclero-keratitis Treated with Tuberculin.

October 15, 1914

Dr. Howard F. Hansell: An Interesting Tumor of the Eyelid.

Dr. John B. Turner: A Case of Congenital Interstitial Keratitis.

Dr. S. Lewis Ziegler: Arterio-sclerotic Changes in the Eye.

Dr. William Zentmayer: A Case of Congenital Cataract.

Dr. George E. de Schweinitz: A Case of Intradural Psammo-endothelioma of the Optic Nerve.

Dr. William T. Shoemaker: A Case of Hypertrophy of the Conjunctiva.

Dr. George S. Crampton: A Case of Follicular Hyperplasia of the Conjunctiva.

Dr. Frederick Krauss: A Case of Traumatic Subluxation of the Lens.

November 19, 1914

Dr. Leighton F. Appleman: A Case of Triple Rupture of the Choroid.

Dr. Frederick Krauss: Spontaneous Dislocation of a Cataractous Lens into the Anterior Chamber.

Dr. John B. Turner: A Case of Epithelioma of the Conjunctiva.

Dr. George S. Crampton: A Case of Congenital Choroiditis.

Dr. William Zentmayer: The Etiology of Trachoma as Presented in Dr. Axenfeld's Thesis.

Dr. Herbert E. Ives (by invitation): Demonstration of a New Visual Acuity Test Object.

Dr. Herbert E. Ives (by invitation): Demonstration of an Electric Daylight Lamp.

George S. Crampton,
Clerk.

REPORT OF THE SECTION ON OTOLOGY AND LARYNGOLOGY

There are twenty-six active members.

During the past year eight meetings were held with an average attendance of ten Fellows and fourteen guests.

Twenty-three subjects were presented and discussed.

The officers of the Section elected December 17, 1913, are:

Chairman—Dr. George Morley Marshall.

Clerk—Dr. Benjamin D. Parish.

Executive Committee—Drs. B. Alexander Randall, S. MacCuen Smith, George B. Wood.

List of Papers

December 17, 1913

Dr. George M. Coates: Report of a Case of Carcinoma of the Larynx with Hemilaryngectomy. Presentation of specimen.

Dr. Wm. R. Butt: Exhibition of Some Recent Anatomical Specimens showing Sinus Relations.

Dr. Nathan Stauffer: Tubercular Meningitis Simulating Brain Abscess. Radical Mastoid and Decompression Operation. Exhibition of brain.

Dr. Lewis Fisher (by invitation): Report of four cases of Sigmoid Sinus Thrombosis. Operation and recovery.

January 21, 1914

Dr. Isaac H. Jones (by invitation): A Case of Tuberculosis of the Lungs, Syphilis of the Throat and of the Larynx. Discussion opened by Dr. Albert P. Francine.

Dr. George B. Wood: The Methods of Invasion in Tonsilar Infections. With lantern demonstrations.

Dr. C. C. Eves: Report of a Case of Removal of a Foreign Body from the Right Bronchus.

February 18, 1914

Dr. E. B. Gleason: A Case of Antrum Suppuration Opened by Means of the Author's Instrument. Exhibition of patient.

Dr. B. A. Randall: A Case of Cerebellar Abscess with Autopsy Findings. Two Interesting Cases of Scarred Drum Heads with Caries of the Stapes.

Dr. James Babbitt: Exhibition of Patient Demonstrating the Result of the Modified Yankauer Lacrymal Duct Operation.

March 18, 1914

Dr. Charles P. Grayson: The Conservation of the Middle Turbinates.

Dr. Nathan Stauffer: The Submucous Operation for the Correction of Internal and External Deformities. Symptoms Indicating Operation. Methods of Performing Same with Difficulties Encountered.

Dr. Douglas MacFarlan (by invitation): Positions for Showing the Sphenoidal Sinus by the *X*-ray. With lantern demonstration.

April 15, 1914

Dr. E. B. Gleason: The Ethmoidal Labyrinth: The Operation Upon the Agger Nasi. Discussion Opened by Dr. George Fetterolf and Dr. Wm. Butt.

May 20, 1914

Symposium on Vaccine Therapy in Otolaryngology.

Dr. B. A. Thomas: The Present Status of Vaccine Therapy.

Dr. John Kolmer (by invitation): The Bacteriology and Vaccine Treatment of Rhinitis and Otitis Media in Infectious Diseases.

Dr. S. MacCuen Smith: Vaccines in the Treatment of Suppurative Otitis Media with Its Intracranial Complications. Discussion opened by Dr. George M. Coates.

October 21, 1914

Dr. E. B. Gleason: A Conservative Treatment in Suppurations of the Nasal Accessory Sinuses. Presentation of specimen mold from a larynx; necrosis of the septum; a supernumerary ear.

Dr. James A. Babbitt: Report of a Case of Foreign Bodies in the Larynx and Esophagus. With presentation of Specimens removed.

November 18, 1914

Dr. Arthur W. Watson: Abscess of the Larynx, with Report of a Case.

Dr. George Fetterolf: The Removal of the Middle Turbinate. A Case of Impacted Cherry Stone in the Ear. Presentation of a Specimen showing an Unusual Lateral Nasal Wall.

Dr. George B. Wood: Report of a Case of Tuberculosis of the Middle Ear in a Child Six Months Old. Exhibition of microscopic slides. A Case of Papilloma of the Nose. Exhibition of microscopic slides.

Benjamin D. Parish,
Clerk.

REPORT OF THE SECTION ON GENERAL MEDICINE

During the past year eight meetings of the Section on General Medicine have been held. At two of the meetings special speakers were invited to address the Section, and on both occasions Mitchell Hall was filled to overflowing (average attendance estimated at 250). The latter of these special meetings was held in conjunction with the College of Physicians. At the six other meetings there was a total attendance of 219 and an average attendance of 36 persons, half of whom were members of the Section.

At the beginning of the year there were 80 members; during the year 8 new members have been admitted and 6 have been lost, 1 by death and 5 by resignation or for other reasons. The total membership on December 1, 1914, was 82.

List of Papers

December, 1913

The Mechanism and Measurement of Radioactive Processes. By Arthur W. Goodspeed, Ph.D. (by invitation).

Some Experiences of a Surgeon with the Use of Radium in Cancer Cases, for the Most Part Inoperable. By Dr. Howard A. Kelly, Baltimore (by invitation).

The Efficiency of Radium in Surgery. By Dr. Robert Abbe, New York (by invitation).

January, 1914

A Patient with Paralysis of the Left Vocal Cord due to Aneurism. By Dr. N. Stauffer.

A Case of Thoracic Aneurism, Treated with Neosalvarsan with Apparent Functional Recovery. By Dr. R. M. Goepp.

A Case of Intention Tremor Following a Shock. By Dr. A. Gordon.
The Treatment of Sciatica. By F. X. Dercum.
Auricular Flutter. By Dr. J. E. Talley.
Food Toxemia or American Gout. By Dr. R. N. Willson.

February, 1914

An Interesting Case of Chronic Lead Poisoning with Relapse following Fresh Exposure. By Dr. J. M. Anders.

A Case of Exophthalmic Goitre after Operation. By Dr. N. Ginsburg.

A Case of Syphilis of the Brain Treated Successfully with Salvarsanized Serum. By Dr. A. Gordon.

Method and Efficiency in Medical Out-Patient Work. By Dr. F. H. Klaer.

The Apparent Toxicity of Infinitesimal Doses of Tuberculin. By Dr. M. S. Cohen.

The Importance of Completing Certain Operations by Removing and Examining Tissues. By Dr. N. B. Gwyn.

March, 1914

A Case of Sprengel's Deformity. By Dr. G. Fetterolf, and Mr. J. H. Arnett (by invitation).

A Peculiar Case of Sweating Sickness and a Case of Scurvy. By Dr. D. Riesman.

Explanations for the Origin of Bronchial Breathing. By Dr. M. Montgomery and Mr. E. A. Eckhardt (by invitation).

The Treatment of Neuritis by Physical Measures. By Dr. A. B. Hirsh.

April, 1914

An Unusual Case of Systemic Infection following Perforation of the Esophagus by a Foreign Body. By Dr. G. M. Coates and Dr. R. M. Goepp.

A Case of Hemochromatosis Presenting many Features of Polycythemia; The Estimation of the Urea in the Cerebrospinal Fluid and the Babinski Reflex as Prognostic Signs in Uremia; and The Four Limb Test for Arterial Spasm. By Dr. H. A. Hare.

The Treatment of Obesity. By Dr. J. M. Anders.

Clinical Types of Adiposis and Lipomatosis. By Dr. G. E. Price.

Two Cases of Excessive Obesity. By Dr. B. H. Buell (by invitation).

May, 1914

A Case of Merycismus; A Case of Hemopericardium from Which More than Four Pints of Fluid were Removed. By Dr. D. Riesman.

Aplastic Anemia. By Dr. J. H. Musser.

The Present Status of Functional Liver Tests. By Dr. E. B. Krumbhaar.

October, 1914

(Special Meeting in Conjunction with the College.)

On Heart Sounds. By Dr. Thomas Lewis, M.D., F.R.C.P. (London).

November, 1914

A Case of Undetermined Continued Fever; its Course and Termination. By Dr. B. F. Stahl and Dr. N. B. Gwyn.

A Case of Typhoid Fever complicated by Orchitis. By Dr. S. H. Rosenthal (by invitation).

Some of the Unusual Features of Tuberculous Meningitis. By Dr. T. McCrae.

The Abderhalden Test with its Relation to Disease of the Liver. By Dr. J. Sailer and Dr. T. G. Schnabel (by invitation).

The Diagnosis Between Primary and Secondary Cardiac Clinical Pictures. By Dr. R. N. Willson.

Clifford B. Farr,
Clerk.

REPORT OF THE SECTION ON MEDICAL HISTORY

There were two meetings of the Section on the History of Medicine during the past year. At the first meeting, December 16, 1913, Professor Morris Jastrow, Jr., read an address on "The Medicine of the Babylonians and Assyrians." The second meeting, November 12, 1914, was addressed by Dr. Otto Juetner, of Cincinnati, on "The Beginnings of Medicine in the Middle West," and by Dr. Edward B. Krumbhaar, who read a paper on "Splenectomy in Ancient and Modern Times."

H. R. M. Landis,
Clerk.

LIST OF PRIZES AND LECTURES

THE WILLIAM F. JENKS MEMORIAL PRIZE

(Triennial)

1889	John Strahan, M.D.	Belfast (Ireland).
1895	Abram Brothers, M.D.	New York.

NOTE—June 12, 1900, the William F. Jenks Memorial Prize Fund was transferred to the Library as the "William F. Jenks Memorial Library Fund."

ALVARENGA PRIZE OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

(Annual)

1890	R. W. Philip, M.D.	Edinburgh (Scotland).
1891	L. Duncan Bulkley, M.D.	New York.
1892	R. H. L. Bibb, M.D.	Saltillo.
1894	G. E. de Schweinitz, M.D.	Philadelphia.
1895	Guy Hinsdale, M.D.	Philadelphia.
1897	Joseph Collins, M.D.	New York.
1898	S. A. Knopf, M.D.	New York.
1899	Robert Randolph, M.D.	Baltimore.
1900	David de Beck, M.D.	Cincinnati.
1901	George W. Crile, M.D.	Cleveland.
1903	William S. Carter, M.D.	Galveston.
1905	D. Chalmers Watson, M.D.	Edinburgh (Scotland).
1907	William Louis Chapman, M.D.	Providence.
1908	William T. Shoemaker, M.D.	Philadelphia.
1910	M. Katzenstein, M.D.	Berlin (Germany).
1911	Francis D. Patterson, M.D.	Philadelphia.
1914	H. B. Sheffield, M.D.	New York.

NATHAN LEWIS HATFIELD PRIZE FOR ORIGINAL RESEARCH IN MEDICINE

(Triennial)

1901	Henry F. Harris, M.D.	Atlanta.
1909	Martin Henry Fischer, M.D.	Oakland.

Note—November 29, 1913, by Supplemental Deed of Trust, the title of this Fund was changed to "Nathan Lewis Hatfield Prize and Lectureship."

WEIR MITCHELL LECTURES

Jan. 17, 1911	Arthur R. Cushny, M.D.	London.
Mar. 30, 1911	Edmund B. Wilson, Ph.D., LL.D.	New York.
May 16, 1911	Svante Arrhenius	Stockholm.
Nov. 3, 1911	William T. Porter, M.D.	Boston.
Mar. 29, 1912	William H. Howell, M.D.	Baltimore.
Oct. 21, 1912	G. H. F. Nuttall, F.R.S., M.D.	Cambridge (England).
April 4, 1913	H. P. Armsby, Ph.D., LL.D.	Pennsylvania.
Feb. 25, 1914	Harvey Cushing, M.D.	Boston.

PUBLIC LECTURES

Feb. 16, 1910	S. Weir Mitchell, M.D.	Philadelphia.
Nov. 17, 1910	Simon Flexner, M.D.	New York.
Dec. 15, 1910	William H. Welch, M.D.	Baltimore.
April 18, 1911	James G. Mumford, M.D.	Clifton Springs, N. Y.
Nov. 20, 1911	Talcott Williams, A.M., LL.D., Litt.D.	Philadelphia.
April 29, 1912	Owen Wister, A.M., LL.D.	Philadelphia.
Feb. 17, 1913	John K. Mitchell, M.D.	Philadelphia.

MÜTTER LECTURES

1865	J. H. Packard, M.D.	Philadelphia.
1866	J. H. Packard, M.D.	Philadelphia.
1867	J. H. Packard, M.D.	Philadelphia.
1868	Harrison Allen, M.D.	Philadelphia.
1869	J. H. Brinton, M.D.	Philadelphia.
1872	J. da S. Solis Cohen, M.D.	Philadelphia.
1879	S. W. Gross, M.D.	Philadelphia.
1882	E. O. Shakespeare, M.D.	Philadelphia.
1885	H. F. Formad, M.D.	Philadelphia.
1888	O. H. Allis, M.D.	Philadelphia.
1890–1891	Roswell Park, M.D.	Buffalo.
1893–1894	De Forest Willard, M.D., and	Philadelphia.
	Guy Hinsdale, M.D.	Philadelphia.
1896	O. H. Allis, M.D.	Philadelphia.
1899–1900	J. B. Roberts, M.D.	Philadelphia.
1901	H. W. Cushing, M.D.	Boston.
1902	L. A. La Garde, M.D.	Washington.
1903	C. N. B. Camac, M.D.	New York.
1904	G. H. Monks, M.D.	Boston.
1905	A. O. J. Kelly, M.D.	Philadelphia.
1906	W. J. Mayo, M.D.	Rochester, Minn.
1907	J. Rogers, M.D., and	
	S. P. Beebe, M.D.	New York.
1908	G. W. Crile, M.D.	Cleveland.
1909	H. D. Fry, M.D.	Washington.
1910	T. W. Hastings, M.D.	New York.
1911	C. F. Nassau, M.D.	Philadelphia.
1912	J. C. Bloodgood, M.D.	Baltimore.
1913	R. C. Coffey, M.D.	Portland, Ore.
1914	F. H. Albee, M.D.	New York.

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